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RIAT
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Contest Rules

Icom IC-7400
tested & reviewed

June 2002
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YAESU

FT-1000MP Mk-V 200W HF ALL MODE

3 YEARS FREE WARRANTY

SPECIAL OFFER

FREE HEIL GOLD LINE MICROPHONE

When you buy the amazing FT-1000 MK V from us, we will offer you FREE the equally amazing Heil Gold Line microphone with dual inserts and matching lead (base stand optional extra).

£2899 C

FT-847 160m - 70cm ALL MODE

3 YEARS FREE WARRANTY

1.8 to 440MHz, this all-in-one station offers unbeatable value. 100W on HF plus 6m, and 50W on 2m and 70cms. You get genuine RF clipping on SSB for up to 6dB gain and there are 4 separate antenna sockets

£1149 C

FT-100 D 160m - 70cm ALL MODE

SAVE

Yaesu's latest version is now available and includes 500Hz CW filter, high stab. oscillator and CTCSS decoder.

£899 B

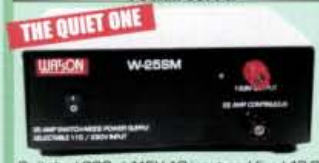
FT- 920AF HF 160m-6m-100W

100 Watts from 1.8 to 54MHZ with dual VFO controls. Supplied with FREE FM unit.

£1099 C

W-25SM 25AMP SWITCH-MODE POWER SUPPLY

THE QUIET ONE



Switched 230 / 115V AC input and fixed 13.8V output at 22 Amps continuous and 25 Amps peak. Over voltage and over current protected and fan cooled. Measures 180mm (W), 75mm (H) and 190mm (D)

£69.95 B

KENWOOD

TS-2000 160m - 70cms+23cms OPTION

3 YEARS FREE WARRANTY

+FREE HEIL HM-10 MIC

The amazing TS-2000 offers coverage from HF to UHF. And you can go right up to 23cms with the optional module Monitor the DX cluster whilst working other DX, optimise your satellite contacts, enjoy the benefit of built-in ATU. It's all there in one very compact box. Colour brochures available on request.

£1695 C

TS-570DG 160m - 10m All Mode

3 YEARS FREE WARRANTY

TS-570 Accessories

• VS-3	Voice synth	£45 A
• DRU-3A	Recording	£99 B
• HS-5	H'phones	£52 B
• MC-90	Desk mic	£187 B
• MC-80	Desk mic	£72 B
• PS-33	Power supply	£199 C
• SP-23	Speaker	£68 B
• CW	Filters each	£61 B
• SSB	1.8kHz	£61.95 B

£849 C

TS-870 160m-10m 100W Advanced DSP

It has IF-stage digital signal processing on transmit and receive. This raises the performance to a level that is impossible for analogue circuitry to achieve. Also features automatic ATU, interactive menu system, built-in electronic keyer and 100 memories.

£1349 C

SGC

SGC SG-2020 £599 A

Ideal for QRP, but with VOGAD and RF speech processing it can sound like 100 Watts! Very low current (4A max) makes it ideal for portable work. Variable selectivity down to 100Hz means no extra filters to purchase.

NEW SG-2020 ADSP now available £799 carriage £9.00

SG-237 mini auto coupler ideal for SG-2020 £369

ICOM

IC-756 PRO II £2495 C

NEW

IN STOCK NOW!

This is Icom's new Flagship.

IC-7400 160m - 2m ALL-MODE

NEW

IN STOCK NOW!

£1499 C

IC-706MkIIG 160m - 70cm ALL MODE

3 YEARS FREE WARRANTY

The IC-706MkIIG is the latest enhanced version of this popular HF/VHF/UHF mobile rig. It has more features but in the same physical size.

IC-706IIG ACCESSORIES

• AT-180	Auto ATU	£379 B
• FL-100	500Hz CW	£59 B
• FL-232	350Hz CW	£59 B
• FL-103	SSB 2.8KHz	£59 B
• FL-223	SSB 1.8kHz	£59 B
• DC Lead	(spare)	£16 A
• 3.5m	sep. cable	£33 A
• 5m	sep. cable	£49 A

£849 C

IC-718 100W HF £649 C

If you are looking for a radio with pedigree, but without a high price tag, then this may the one for you. Covers all HF bands including wideband receive. Plus auto notch, dual vfo, swr meter etc. Plus options including DSP & filters.

YAESU

FT-1000MP MKV FIELD £2199 C

NEW

100W & Built-in PSU

YAESU

FT-1500M • 2m FM Mobile £159 C

SPECIAL OFFER

'SAVE £70'

Small, compact yet built like a Battleship! Should last for years. Look at the Price!

KENWOOD

TM-D700E • 2m + 70cm FM £449 C

Large detached screen and APRS, make this a firm favourite. 50W on 2m and 35W on 70cms. Features 200 memos, CTCSS, Band Scope, built-in TNC, DX cluster monitor, alphanumeric etc.

TM-G707E • 2m + 70cm FM £289 C

If you are looking for simplicity and low cost, here's the answer. 2m &70cms with detachable front panel and "Easy operation mode." GREAT!

TM-V7E • 2m + 70cm FM £359 C

A lovely cool blue display, easy with 50/35W output. 50W/35W plus 280 memos and five storable operating profiles.

ICOM

IC-207H • 2m + 70cm FM £279 C

A great budget class radio for VHF & UHF use.

IC-2800H • 2m + 70cm FM £419 C

Large colour display with video input, and airband rx. 50W/35W and remote head unit.

IC-2100H • 2m FM Mobile £229 C

Rugged design with switched receive filters 12.5/25kHz

IC-910 2m + 70cm All Mode £1299 C

Icom's new dual band all-mode base station radio with 23cms option.

YAESU

FT-7100 • 2m/70cm Mobile £299 C

SPECIAL OFFER £299

Just arrived is this new dual band radio that has extended rx. Power is 50/35W. Features dual in-band reception and detachable display (requires YSK-7100).

AMAZING VALUE

£25 ACCESSORY VOUCHER

KENWOOD

TH-D7E • 2m + 70cm £299 C

DATA COMMUNICATOR

One of the most successful handhelds over the past few years. It has a built-in TNC for Packet use. You can also use it for APRS operation in conjunction with an external GPS unit. Plus NMEA, 200 memos, and up to 5W output.

TH-F7E • 2m + 70cm £249.95 C

NEW

WITH EXTRA WIDE RX COVERAGE

- 144-146MHz Tx/Rx FM
- 430-440MHz Tx/Rx FM

Up to 6W out with Li-ion battery and "scanner" style coverage from 100kHz to 1300MHz including SSB on receive! This is a great radio to have at all times when you are on your travels.

THG-71E £199 B

- 144 - 146MHz FM
- 430 - 440MHz FM
- 3 power levels
- 6W (13.8V) 5.5W (UHF) HI
- 0.5W LO • 50mW EL
- 200 multi-function memories
- Freq. deviation: ±5kHz
- CTCSS tone encoder/decoder
- Illuminated keypad,
- memory name function
- Auto power off • Auto batt. saver
- Time-out timer
- 5.5 - 16V DC (13.8V)

HORA

HORA C-408 • 70cm £49 B

HOCKLEY ONLY

Very much underrated handy. Covers the full 70cm band. Wideband receive possible. Very compact fits into top pocket. Ideal for use at rallies. Only uses 2x AA batteries (not included).

- 230mW, CTCSS
- Digital Display

SPECIAL OFFER

YAESU

YAESU VX5R • BLACK OR SILVER £239 B

Tiny but incredibly rugged, the VX-5R provides transceiver capability on three amateur bands (50/144/430MHz) and almost continuous reception from 500kHz up to 999MHz.

YAESU VX1R • 2m/70cm £145 B

Ultra-wide frequency coverage which includes VHF and UHF TV audio, AM broadcast, FM broadcast and AM airband.

FT-817 'SPECIAL OFFER'

SAVE

INCLUDES AC CHARGER AND 1 AMP Ni-cad PACK

The amazing FT-817 offers all-modes from 1.8MHz - 440MHz with up to 5 watts out. Buy one of our "WALKABOUTS" antennas at the same time and SAVE EVEN MORE! We will give you an extra 10% DISCOUNT on the antenna!

£595 carr.£9

NEW MINI SM PSU PS-817 **£19.95**

RT-11 REMOTE AUTOTUNER £239 B

NEW

NEW FROM LDG

ASK FOR DETAILS.
ALSO AVAILABLE IN KIT FORM.

GZV-4000 40A 5-15V Switch Mode

DIAMOND ANTENNA

- Output voltage 5 - 15V DC
- Output current 40A continuous
- Built-in cooling fan
- Supply 230V AC 50Hz
- Size 210 x 110 x 300mm
- Weight 3.5kg

£159 C

W-CRI PADDLE KEY £44.95 B

- Metal parts brass
- Hardwood base
- Size 145 x 80 x 50mm
- Weight 375g

W-GMP Morse Key £29 A

- Metal parts brass
- Hardwood base
- Miniature size
- Size 100 x 50 x 45mm
- Weight 150g

Kent Morse Practice Oscillator £19.50 A

- Size 160 x 55 x 97mm
- Weight 260g

'Amazing' MP-1 Variable Antenna 7MHz - 430MHz! 150 Watts

Use Portable, Mobile, Home or even balcony!

SLIDE TO CHANGE BANDS!!

It's sweeping America as the most versatile antenna for any location. Kit includes telescopi whip, variable coil, lower mast, base bracket (SO-239), clamp and optional wire radials (3m approx). Total height approx 2m. Will also screw directly into 3/8" mobile mounts. The whole antenna packs down to pocket size, yet puts together in a couple of minutes. And with the high Q coil, you get high efficiency. Take it with your FT-817 as hand luggage!!

£149.95 carr.£9

PBX-100 Portable HF £99 C

80m - 10m 200W

The PBX 100 offers 80m - 10m operation (max 4-bands at any time) with a height of just 3.6m. Supplied with ground spike, it takes seconds to erect, yet collapses down to little more than 1m, like all ground mounted verticals, it benefits from radials, and the radial wire is provided. Use it in the garden, in the countryside or abroad. SO-239 connection.

MP-1 Options

TRIPOD **£19.95 A**

Compact tripod for free standing MP1

MP-80M **£22.95 A**

80m Coil for MP-1 3.4MHz - 4MHz

FT-817 BRACKET

MP1 bracket mounts on side of FT-817

£19.95 A

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Get in Front with HUSTLER

CARRIAGE CHARGE CODES: A=£2.75, B=£6, C=£9, D: £12

5BTV

£209.95
Carr. £9.00

4BTV

£169.95
Carr. £9.00

HUSTLER®

BASE STATION ANTENNAS

Spec	5BTV	4-BTV
Bands	5	4
Coverage	80m-10m	40m-10m
Bandwidth 10-40m	Full	Full
Bandwidth 80m	100kHz	N/A
Resonance	1.15:1	1.15:1
Power	1kW CW	1kW CW
Traps	1" forms	1" forms
Tubing	1.25"	1.25"
Bracket size	1.75"	1.75"
Height	25ft 1" (7.64m)	21ft 5" (6.52m)
Weight	17lbs. (7.7kg)	15lbs (6.8kg)
Wind (112kph)	13kg	-

"I worked my first ZL while actually on the move using a Hustler whip" - Peter Waters G3OJV. Customers are also telling us how pleased they are with the base verticals. Check the prices!

HUSTLER Mobile Antennas

Model	Band	Bandwidth	Price
RM-10	10m	150-250kHz	£19.95 B
RM-11	11m	150-250kHz	£19.95 B
RM-12	12m	90-120kHz	£19.95 B
RM-15	15m	100-150kHz	£19.95 B
RM-17	17m	120-150kHz	£24.95 B
RM-20	20m	80-100kHz	£24.95 B
RM-30	30m	50-60kHz	£26.95 B
RM-40	40m	40-50kHz	£26.95 B
RM-80	80m	25-30kHz	£29.95 B

Model	Band	Bandwidth	Price
RM-10-S	10m	250-400kHz	£24.95 C
RM-15-S	15m	150-200kHz	£26.95 C
RM-20-S	20m	100-150kHz	£31.95 C
RM-40-S	40m	50-80kHz	£37.95 C
RM-80-S	80m	50-60kHz	£51.95 C

Lower mast sections

MO-1	54" (FOLD @ 22")	£33.95 C
MO-2	54" (FOLD @ 27")	£33.95 C
MO-3	54" (NON FOLD)	£26.95 C
MO-4	27" (NON FOLD)	£22.95 C

GARMIN®

STREET PILOT III £945 B

IT TALKS TO YOU

It talks to you and is supplied with street level mapping, 32Mb storage card and card reader for quick PC programming. Examples of voice info are: "turn left 2 miles," "take 2nd left at next roundabout", "house number 17 is on your left," "turn right in 300ft." These are in stock now.

NEW NEW NEW

CUSHCRAFT COMMUNICATIONS ANTENNAS

HF HORIZONTAL BEAMS + DIPOLES

When you buy an HF Yagi, you want quality and realistic performance. You also want to know you can get spares. We offer a wide choice with guaranteed spares availability. COUNT ON US!

MA5B	10-20m (5 band) 3 el 2.7m radius 1.2kW	£349.95 C
X-7	10-20m 7 el. 12.5 - 13dBi 2kW 6.09m radius	£669.95 D
X-740	40m add on kit for X-7	£299.95 C
A4-S	10-20m 4 el. 8.9dBi 2kW 5.49m radius	£599.95 D
A-744	Gives 40m or 30m operation from A-4S	£159.95 C
A3-S	10-20m 3 el. 8dBi 2kW 4.72m radius	£499.95 D
A-743	Gives 40m or 30m operation from A3-S	£159.95 C
A3-WS	12 & 17m 3 el. 8dBi 2kW 4.4m radius	£399.95 D
A-103	Gives 30m operation from A3-WS	£159.95 C
D-3	10-20m dipole element 7.86m 2kW	£249.95 C
D-3W	12, 17, 30m 17m dipole element10.37m 2kW	£249.95 C
D-4	10-40m dipole element 10.92m 2kW	£329.95 C
D-40	40m dipole element 12.88m 2kW	£299.95 C
Ten-3	10m 3 el 8dBi 3m radius 2kW	£189.95 C
ASL-2010	13.5-32MHz 8 el. log periodic6.4dBd 5.86m radius	£799.95 D

THE MINI-BEAM FOR SMALL GARDENS

Cushcraft MA5B

The best 3 element mini beam you will ever find. 2 element gain on 10, 15 & 20m, and dipole performance on 12m and 17m. Up to 25dB F/B ratio, it accepts 1.2kW yet has a boom length of only 2.2m and element length of just 5.2m Turning radius is 2.7m. Uses a single feeder, this really works the DX. Get one up before winter! £349.95 C

CUSHCRAFT VERTICALS

R8 [illustrated], covers 8 bands from 6m - 40m, stands 8.7m high and requires no radials. You can feed it with 1.5kW and typical VSWR is around 1.2:1 £499.95 C

R8-GK Optional guy kit for R8 £49.00 B

R-6000 6 band 6m-20m that requires no radials and handles 1.5kW. Stands just 5.8m high and was chosen for the RSGB GB4FUN vehicle antenna. It works!! £349.95 C

NEW MA5V VERTICAL 20-10m £229.95 C

WATSON

WEP-300B • EARPIECES £2.95 A

Over-the-ear earpiece, popular for security and emergency use. Its low cost and firm mounting even in arduous conditions make this a popular item. Fitted with 3.5mm jack plug.

WSA-1 PSK-31 Adaptor £39.95 B

All you need to connect up to your sound card and run PSK-31. Includes CD software.

YS-130 £79.95 B

Ideal for medium sized VHF antenna systems, the YS-150 is a good quality Japanese manufactured product. It is supplied with control box with rotary direction setting, plus upper and lower in-line mast clamps.

REVEX • 15W DUMMY LOAD £19.95 A

- Range DC - 500MHz
- Power 15W/50W
- VSWR 1.15:1
- Connector PL-259
- 50 Ohms impedance
- Size 34 x 72mm
- Weight 70g

MASPRO VHF/UHF YAGIS

These high quality Yagis are made in Japan and superbly engineered. Features folded dipole, balun transformer, waterproof box and SO-239. You won't find anything better on the market.

Take a look at our prices!

144-WH5	2m 5 el. 6.6dBd 0.93m	£26.95 B
144-WH8	2m 8 el. 8.6dBd 1.79m	£37.95 B
144-WH10	2m 10 el 9.7dBd 2.3m	£41.95 B
435-WH8	70cms 8 el. 8.6dBd 0.8m	£29.95 B
435-WH12	70cms 12 el. 12.8dBd 1.51m	£35.95 B
435-WH15	70cms 15 el. 14.2dBd 2.19m	£41.95 B

To compare with dBi figures, add 2.4dB

WATSON

QS-112 • SPEAKER MIC £16.95 A

Combined speaker-mic. with PTT switch. Models for Yaesu, Kenwood, Icom, Alinco and Motorola.

SPM-102 • SPEAKER MIC £9.95 A

Incredible value!

Has 4-way 3.5mm plug for VX-1, VX-5, FT-50 and IC-Q7E Handies

Limited stocks.

WM-308 • BASE MIC £59.95 B

The perfect answer for a high quality base microphone. Built-in pre-amp powered from rig or 2 x AA, electronic PTT and FM/SSB response switch. Includes lead with 8-pin plug. The plug needs to be wired for your radio. We can do this but phone for quote.

WCT-321 • LAPEL TALKER £19.95 A

The elegant way of personal communications.

Earpiece with combined lapel hanging mic and PTT. Models to suit most radios.

State: Kenwood, Yaesu or Icom when ordering

AVAIR VSWR • POWER METERS

Great value and great performance. There's one just right for you.

AV-200 1.8 - 200MHz 5/20/200/400W £49.95 B
AV-400 140 - 525MHz 5/20/200/400W £49.95 B
All fitted with SO-239. PEP/RMS readings. 3W for FSD approx.
Also available AV20 & AV40 compact meters

WATSON

ATX WALKABOUTS

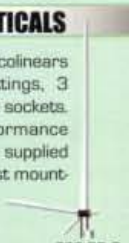
WALKABOUT PORTABLES

Multi & single telescopic whips. Covers 80m to 6m BNC. Ideal for FT-817 and similar QRP radios.

ATX Walkabout 80 - 6m	£69.95B
AT-80 Single band	£24.95B
AT-40 Single band	£24.95B
AT-20 Single band	£19.95A
AT-17 Single band	£19.95A
AT-15 Single band	£19.95A
AT-12 Single band	£19.95A
AT-10 Single band	£19.95A

BASE VHF/UHF VERTICALS

2m / 70cm fibre glass colinears with stainless steel fittings, 3 short radials and SO-239 sockets. These are high performance antennas, pre-tuned and supplied with all hardware for mast mounting.



Dual Band 2m/70cms

W-30	3/6dB 1.15m long	£39.95 C
W-50	4.5/7.2dB 1.8m long	£49.95 C
W-300	6.5/9dB 3.1m long	£59.95 C

Triple band 6m/2m/70cms

W-2000	0/6/9dB 2.5m long	£69.95 C

GREAT VALUE MOBILE WHIPS

W-285	2m 5/8th whip with PL-259 base £14.95 B
W-7900	2m/70cm 5 & 7.5dB length 1.58m £32.95 B
W-627	6m / 2m / 70cm 2 / 4.5 7.2dB length 1.6m £34.95 B
W-770HB	2m/70cm whip 3dB / 5.5dB length 1.1m £24.95 B

ALL WITH TILTOVER BASES

BUY ONE OF THESE TUNERS IN MAY, JUNE OR JULY & CLAIM AN INSTANT £50 DISCOUNT OFF THESE PRICES!
THIS DEAL IS AVAILABLE DIRECT FROM WATERS & STANTON, LOWE, JAYCEE, MARTIN LYNCH, HAYDON & ALL GOOD DEALERS.

SGC
NO COMPROMISE COMMUNICATIONS

SMARTUNER™–THE WORLD'S BEST SELLING COUPLERS

SG-230 SMARTUNER™

'HF BANDS UP TO 200W'

£359

- 1.6 - 30MHz
- 3- 200 Watts
- 170 non-volatile memory addresses
- Tune time: 10ms
- Input: SO-239
- Output: High voltage terminal
- Supply: 12 - 14V 750mA approx. (optional 24V available)
- Fully weatherproof
- Size: 406 x 305 x 76mm

SG-237 SMARTUNER™

- 1.8 - 60MHz
- 3- 100 Watts
- 170 non-volatile memory addresses
- Tune time: 10ms
- Input: SO-239
- Output: High Voltage terminal
- Supply: 12 - 14V 300mA approx.
- Fully weatherproof
- Size: 178 x 229 x 38mm

'HF + 6m COMPACT SIZE'

£369

SG-239 SMARTUNER™

'LOW COST MINI-SIZE'

£289

- 1.8 - 30MHz
- 1.5 - 200W (PEP)
- 170 non-volatile memory addresses
- Instant tuning from memory (<10ms)
- Antenna: Min length 2.75m 3.5-30MHz
- Input impedance range 0.2- 5.000 Ohms
- Separate connections for antenna & ground
- DC supply 10-18.5V DC current 230mA
- Size: 190x 150 x 45mm
- Weight: 907g

SG-231 SMARTUNER™

- Frequency 1MHz to 60MHz
- Power input 3 - 100W (PEP)
- 50W max CW
- VSWR: <1.4:1 (typical)
- 170 non-volatile memory addresses
- Antenna: Min length 2.4m 3.5-60MHz, Min length 7m 1-60MHz
- Input impedance range 45 - 55 Ohms
- Output: Ceramic terminal
- DC supply 13.6V DC 0.9A
- Fully weatherproof housing
- Size: 292 x 241 x 44mm
- Weight: 1.7kg

HF + 6m

£399

SG-235 SMARTUNER™

'HIGH POWER 500W'

£1395

- Frequency 1.8 to 30MHz
- Power input 3 - 500W (PEP) 200W max CW
- VSWR: <1.4:1 (typical)
- 170 non-volatile memory addresses
- Antenna: Min length 2.4m 3.5-30MHz, min length 7m 1.8-60MHz
- Input impedance range 45 - 55 Ohms
- Output: Ceramic terminal
- DC supply 13.8V DC 1.4A
- DC operating range: 10 to 17V
- Fully waterproof housing
- Size: 406 x 305 x 76mm
- Weight: 3.5kg

CLAIM YOUR £50 DISCOUNT IN MAY JUNE OR JULY

BUY ONE OF THESE TUNERS IN MAY, JUNE OR JULY & CLAIM AN INSTANT £50 DISCOUNT OFF THESE PRICES!
THIS DEAL IS AVAILABLE DIRECT FROM WATERS & STANTON, LOWE, JAYCEE, MARTIN LYNCH, HAYDON & ALL GOOD DEALERS.

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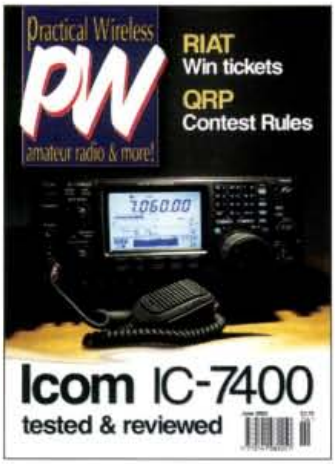

Cover Subject
The latest radio to come from Icom, the IC-7400 proved a joy to use providing reviewer **Richard Newton G0RSN** with hours of radio enjoyment and the chance to get experimental with his antenna arrays! Read the full review in this issue for the lowdown on the IC-7400, which G0RSN reckons will be as popular as its predecessor the IC-746!

Photograph: **Tex Swann G1TEX/M3NGS**
Design by: **Bob Kemp**

June features

June regulars


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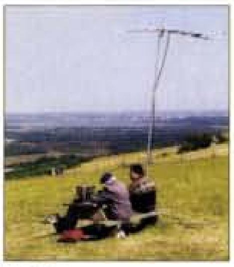
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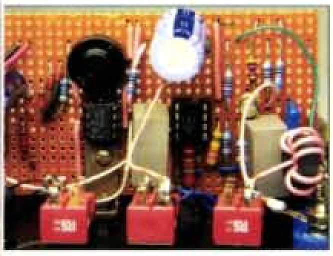
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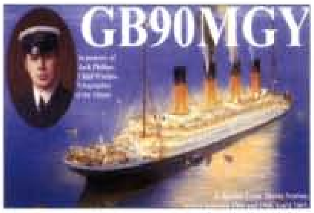

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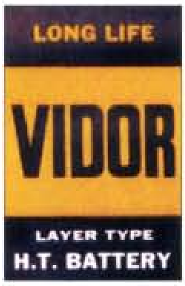

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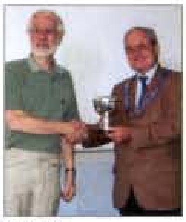
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rob mannion's keylines

Welcome to 'Keylines'! Each month Rob introduces topics of interest and comments on current news.

Strong opinions abound in a specialised activity such as Amateur Radio and even a quick glance at our letters pages (and indeed Keylines itself!) will indicate just how strongly held the opinions can be! However, those strong opinions can often lead to some really firmly held beliefs as to what goes on in an Editorial chair...leaving the occupant of that chair (**me!**) feeling very frustrated.

I'll explain: it often seems to me (I seem to get episodes of paranoia) that whatever I try to do regarding 'Editorial Balance' in *PW* there's often someone - or a group of people - who consider that I am censoring some aspects/subjects or opinions and promoting others. And of course I say '**I**' at this point because even though *PW* is produced by a totally dedicated team of Amateur Radio journalists...**the 'Buck really stops here' as I am the Editor**.

● (Onlooker) "It's the Editor's attempt to try to achieve an honest balance of opinions in the 'Reader's Letters' pages in *PW*. It looks like an on-going struggle"!

Editorial Balance

The humorous cartoon prepared by Worthington our cartoonist (Cartoonists are traditionally referred to just by their surnames in publishing and it doesn't reflect my thoughts on how unflatteringly he's depicted me!) is aimed at conveying **just how difficult** Editorial Balance is. **John GW3COI**'s cartoon also cleverly indicates the weight of the responsibility that comes my **weigh** (joke!) in our attempts to produce a balanced selection of letters. As I sit here I try to remember that I have my opinion and the other person has a prejudice - keeping that in mind helps when listening to or reading other opinions.

Of course, I must be prepared to accept that there are some readers who'll never be convinced of our attempts to publish a non-biased selection of letters. Unfortunately they're often the same people who cannot be convinced of the editorial teams' attempts to produced objective and honest reviews. I get so frustrated - perhaps I should write a letter to an Editor to vent my own spleen?

The main bone of contention recently has involved the many letters and opinions regarding the introduction of the Foundation Licence. Keyboards have been steaming and pens melting with strong opinions coming from all four corners of the discussion 'boxing ring'. However, despite my assurances that we at least try to publish letters **For** and **Against** in the proportion as received in the Broadstone offices - there's obviously a problem so be solved and I think there's a way we can do it within *PW*'s covers.

For & Against Articles

In our attempt to provide a good balance of opinions I've written to two different potential authors who have equally strongly held opinions regarding the Foundation Licence but from opposing viewpoints. Neither author will be named at the moment, but they've both been asked to write one page articles promoting their own point of view.

Both articles will be exactly the same length in words, and I have asked the authors to provide photographs of themselves operating their Amateur Radio equipment. The only differences will be in the opinions held on the core subject of the Foundation Licence.

Both articles must appear together in the same issue of *PW*. Obviously, until we get both - publication won't occur but I hope they'll both appear soon.

Following publication the individual readers can form their own opinions on the subject. However, neither author (having had their say and being paid for publication) will have letters **on the same subject** published in our letters pages thus making room for other opinions. I have no doubt though that we'll get letters on other topics from them in the future and they'll be considered for publication along with the hundreds of others we receive each month.

Pink Slips & Vouchers

Whilst the subject of letters published in *PW* is in focus, I'd like to ask readers who have had their opinions/suggestions/comments, etc., appear on the Amateur Radio Waves pages to ensure they claim their £5 and (for the Star letter) £10 vouchers. The vouchers can be used by sending in with orders to the offices, or exchanged for books and towards subscriptions on the PW Publishing stand at the various rallies/shows we attend.

All the voucher winners have to do it to return the pink slip sent to them acknowledging publication of their letter. When it's signed and returned to us, we'll send you a voucher which is valid for a year. So, remember to claim and don't lose out!

Rob G3XFD

practical wireless services

Just some of the services *Practical Wireless* offers to readers...

Subscriptions

Subscriptions are available at £30 per annum to UK addresses, £38 in Europe and £42 (Airsaver), £49 (Airmail) overseas. Subscription copies are despatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both Practical Wireless and Short Wave Magazine are available at £60 (UK) £73 (Europe) and £81 (rest of world), £85 (airmail).

Components For *PW* Projects

In general all components used in constructing *PW* projects are available from a variety of component suppliers. Where special, or difficult to obtain, components are specified, a supplier will be quoted in the article. The printed circuit boards for *PW* projects are available from the *PW* PCB Service, **Kanga Products, Sandford Works, Cobden Street, Long Eaton, Nottingham NG10 1BL. Tel: 0115 - 967 0918. Fax: 0870 - 056 8608.**

Photocopies & Back Issues

We have a selection of back issues, covering the past three years of *PW*. If you are looking for an article or review that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. Back issues for *PW* are £2.50 each and photocopies are £2.50 per article.

Binders are also available (each binder takes one volume) for £6.50 plus £1 P&P for one binder, £2 P&P for two or more, UK or overseas. Prices include VAT where appropriate.

A complete review listing for *PW/SWM* is also available from the Editorial Offices for £1 inc P&P.

Placing An Order

Orders for back numbers, binders and items from our Book Store should be sent to: **PW Publishing Ltd., Post Sales Department, Arrowsmith Court, Station Approach, Broadstone Dorset BH18 8PW**, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling. Credit card orders (Access, Mastercard, Eurocard, AMEX or Visa) are also welcome by telephone to Broadstone **(01202) 659930**. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX an order, giving full details to Broadstone **(01202) 659950**.

The E-mail address is **bookstore@pwpublishing.ltd.uk**

Technical Help

We regret that due to Editorial time scales, replies to technical queries cannot be given over the telephone. Any technical queries by E-mail are very unlikely to receive immediate attention either. So, if you require help with problems relating to topics covered by *PW*, then please write to the Editorial Offices, we will do our best to help and reply by mail.

amateur radio waves

The Star Letter will receive a voucher worth £10 to spend on items from our Book or other services offered by *Practical Wireless*.

All other letters will receive a £5 voucher.

Make your own 'waves' by writing into *PW* with your comments, ideas, opinions and general 'feedback'.

Foundation Power Mod

● **Dear Sir**

Some of the Foundation Licence and QRP/p operators might find the following circuit idea of great use. Using a 1.5V battery (PP3 battery for the older vacuum valved rigs requiring -8V automatic level control (a.l.c.) biasing and a 100kΩ potentiometer, this simple circuit can be used to reduce the output of many 100W class transceivers to 5W or less. Most transceivers have an a.l.c. connection on the back that's connected when using an external amplifier.

In many cases, the connection is a phono jack to which the negative bias is applied to the centre pin from the amplifier. This same connection may also be used to reduce the transceiver's output power to a desired level by applying a small amount of negative bias to it.

The battery is connected across the two outer legs of the potentiometer. The centre leg (wiper arm) is connected to the a.l.c. input and the positive side of the battery is connected to AGC ground. A single turn potentiometer may be used. A 5 or 10 turn potentiometer will give a much smoother control of the output. Some of the older rigs like the Yaesu FT-101B and FT-757GX do not have menu selected settings of 10, 50 and 100W that is used in the Kenwood TS-50 and Alinco DX-70, etc. This is a much easier way to control output power instead of using the microphone gain control on the front. I'm currently using this circuit to reduce the output of my FT-757GX while operating on 'Top Band', operating QRP and on RTTY/AMTOR/Packet. Hopefully some *PW* readers will find this circuit a useful accessory to their station.

John Norton
G/N9LYE
Great Yarmouth
Norfolk

Editor's comment: Thanks John. The idea works well as I can testify. And yes, John is originally from the USA!

Foundation Licence May Feedback

● **Dear Sir**

The letter from **Walter Farrar G3ESP**, published in May's *PW* outlined the exact reason for a Foundation Licence to be introduced. If Mr Farrar has not noticed, easier ways of communication have arrived on the Internet, in the form of E-mail, ICQ and so on; much easier than studying for, and sitting, the RAE.

Mr Farrar took time to outline the requirement in 1948 for an Amateur Radio Licence; 12w.p.m. Morse proficiency and for the RAE, two written papers. One could side-step the RAE requirement by offering 'any alternative or better qualification'. Mr Farrar was not slow in pointing out his B.Sc in Physics plus five years at the Signals Research and Development Establishment that obviated his taking the RAE.

Apart from the RAE paper changing from a written script to multi-choice there still are two papers. Failure in one, results in an overall failure as in 1948. However, one can no longer offer an "alternative or better qualification" (G3ESP also stated that he earned the privilege) and that "Nowadays people want things without having to make an effort". "That", he states "is an unworthy ambition".

I take issue with Mr Farrar's letter in its entirety. In 1948 Amateur Radio was the reserve of those from a privileged background, much like a University education and the resultant degree. It's that elitism and apparent snobbery that has pervaded Amateur Radio throughout its history and has certainly contributed to the state of decline that we now find our hobby is suffering from. Advancement is a necessary requirement for the furthering of any interest, be it commercial or personal. Entry to h.f. is now somewhat different and the acquisition of 12w.p.m. Morse is not a total necessity. After all, whether Mr Farrar likes it or not, there are many more modes of greater technological advancement than Morse, which has now been virtually discontinued by professional/marine stations.

The purchase of brand new equipment was not a likely event in 1948 and construction or modification of surplus equipment would have been the order of the day. This need demanded construction and basic soldering skills. Sadly, this is now in decline due to the business efforts of manufacturers and suppliers.

The introduction of the 'B' licence was an excellent idea. Many B licence holders have contributed in the field of v.h.f., u.h.f. and s.h.f., communication methods. However since 1981 we have CB, which is also now in decline, as well as the recent introduction of 'licence free' communication on 49 and 446MHz.

Not everyone wishes to learn Morse. Some of us are even obviated from being able to decode Morse due to medical reasons. Surely it's all a matter of choice as to what particular mode/ or modes the individual wishes to favour?

What is an absolute necessity is self-discipline and an awareness of a professional approach when one sends on whatever mode you have chosen to use. Blinkered views such as those suggested by G3ESP will not help Amateur Radio further itself. It's not a matter of wanting things without making an effort, as he intimates. Instead, it's but more of making a dying interest more attractive in a World where there are many seemingly easier alternatives. That, Mr Farrar, is why the Foundation Licence is so necessary.

Paul Beaumont MIScT,
G7VAK
Upper Norwood
London

Editor: Please see Keylines for comment.

Foundation Licence

● **Dear Sir**

Radio has been part of my life since the late 1960s. I purchased my first *PW* as a schoolboy in June 1973 and finally obtained my Class 'B' licence in 1981. Even in those days, I can recall the heated debates regarding the merits of c.w. raging, on and off the air!

It has been long forgotten that many a licence was granted on the basis of a Morse test only. Not for the 'old timers' was it necessary hours of burning the midnight oil to pass the dreaded RAE. Was it unfair to burden prospective Amateurs with the new fangled examination? It was the same when Novice/Intermediates were allowed onto 50MHz

Why do so many people resent the changes? We all resist it, **yet it's change that propels us into the future**.

Never in the history of Amateur Radio has its very existence been challenged such as now. Play Stations, telephone/computerised Internet communications, mobile 'phones are all providing sophisticated levels of communication and entertainment without the hassle of a licence.

As an instructor and invigilator I was saddened to see that the advent of the multiple-choice examination led to a drop in the understanding of the hobby. Pass rates and scores soared and the 'black box' operator syndrome set in.

Dwindling numbers, and continued commercial interest in our

spectrum, etc., now dictate that Amateur Radio take drastic steps to ensure the growth of the hobby and protection of its spectrum.

The Foundation Licence is the first of these steps; removal of the Morse requirement will be another. At last, a hands-on, practical method of getting youngsters and 'Old Timers' alike onto the air.

Time has proven that policing the power limits need not exist, It has never been necessary to police the compliance of 'A' class licence power limits, so why should Foundation Licensees be any different? Given the lower power, space limitations, the new licensees are going to have to be very creative with their antennae to get that 10W around the World.

The only flaw as I see it, was the omission of 28MHz for the new licensees. I have heard some very 'wishy washy' reasons for this...but firmly believe that it would have been more prudent to have omitted other frequencies and allocated a section of this vastly under utilised band. This would help to further DX and operating skills without the congestion and overpowering signals found lower down the spectrum. The RSGB and the RA are to be commended on this Licence.

S. Poysden
G1BND/ZR6AGN
(hopefully M3BND)
Bracknell
Berkshire

Back In The Hobby

● **Dear Sir**

I've recently started to get back into our hobby after several years of enforced absence. This includes taking *PW* once again and I must say that having tried the other magazines now and again to see if I am missing anything, I always seem to gravitate back to *PW*!

I had an idea (not original I admit) for a regular feature you might wish to consider because, for me (and I suspect many of us) our hobby still holds many mysteries which could I'm sure, be explained in simple terms **by other readers**.

My suggestion is to have a Readers' Forum or 'Q & A Forum' where a reader's technical question (or two) could be posed, with readers' answers appearing in a later issue. In some cases there may be several "plausible" answers received for a question which may not have a definite "right answer", adding to the general interest and opening up a debate. I have literally got over 20 such questions and I don't consider myself to be particularly technically naive!

For starters:(i) "What's so special about 50Ω and 75Ω? Can you actually measure these values"?, "Why don't radio manufacturers offer a simple 'Proven to work reasonably well with this radio' antenna at point of sale. Despite the wonders of sophistication of modern rigs, the actual radio performance is very largely down to the antenna - which for many is a piece of wire costing less that a £5 slung between the trees! (not really a technical question but one which perplexes me!). And "Does the presence of insulation on a wire antenna make a difference to its performance over an identical antenna but without insulation"? Finally..."What sort of power would be needed on 144MHz to reach the moon reliably"? (We'll need to know one day!) etc, etc. Please accept my apologies if this has been tried before or the suggestion appears plain daft! With best wishes and thanks again for an excellent magazine.

Peter Fardell G0LQU
St. Albans
Hertfordshire

Another Suggestion

● **Dear Sir**

Just an idea - when I was living in Germany I used to subscribe to a magazine called *Funk Amateur*. The content of this magazine was much the same as *PW* (do you have any dealings with them?), including many of the same reviews etc. One thing they did have though, which I believe would be a good idea to include in *PW*, was a monthly list of radio nets. For example, 28MHz nets, AMSAT nets, QRP nets, etc. Would it be possible for you to include something like this in *PW* so I and others have some idea as to when and where to listen in order to join in with the nets? I don't think that v.h.f./u.h.f. nets are so important, as these are relatively localised, but the various h.f. nets that are worldwide and of interest to all operators. I hope you can be of help.

Nigel Booth M0CVO
Cromer
Norfolk

Editor's comments: Peter Fardell's suggestions are in fact catered for by the 'Tips & Topics' column compiled by our own Tex Swann G1TEX/M3NGS. Peter's ideas are splendid and I hope you'll all flood Tex with ideas. 'Swans' need plenty of water to take off, see if you can help! Nigel M0CVO's ideas fit neatly with the HF Highlights' column compiled by Carl Mason GW0VSW. Please support him too Nigel!

● Keep your letters coming to fill *PW*'s postbag

Letters Received Via E-mail

A great deal of correspondence intended for 'letters' now arrives via E-mail, and although there's no problem in general, many correspondents are forgetting to provide their postal address. I have to remind readers that although we will not publish a full postal address (unless we are asked to do so), we require it if the letter is to be considered. So, please include your full postal address and callsign with your E-Mail. All letters intended for publication must be clearly marked 'For Publication'.

Editor

amateur radio rallies

Radio rallies are held throughout the UK. They're hard work to organise so visit one soon and support your clubs and organisations.

May 12

Dunstable Downs Radio Club Car Boot Sale
FAX: (01525) 383898
E-mail: ddrc@magstripe.demon.co.uk
Website: www.ddrcbootsale.freeserve.co.uk
Dunstable Downs Radio Club will be holding its 19th Annual National Radio Car Boot Sale at Stockwood Country Park, Luton, Bedfordshire. Site opens from 0900 until 1500 - leave M1 at junction J10 and follow signs for 'The Mossman Collection'. Talk-in on S22.

May 19

Midland ARS Radio & Computer Rally
Contact: Peter G6DRN
Tel: 0121-443 1189 (evenings please)
The Midland Amateur Radio Society are holding their Drayton Manor Radio & Computer Rally at Drayton Manor Park, Fazeley, Tamworth, Staffs. The main traders will be in three marquees, there will also be a large outside flea market, Bring & Buy, local clubs and societies and special interest stands. Doors open from 1000 onwards.

May 26

Spalding & District ARS Annual Rally
Contact: Ray M0CTM/John G4NBR
Tel: (01775) 711953/(07946) 302815
Website: www.sdars.org.uk
The Spalding & District Amateur Radio Society Annual Rally is taking place at the Springfields, Exhibition Centre, Spalding. There will be club and trade stands, refreshments, free car parking, car boot area, tombola and raffle. Overnight camping is available by prior arrangement.

May 26

The Stirling & District ARS Mini Rally
Contact: Brendan GM0BWR
Tel: (01259) 761299
E-mail: bcoan@tiscali.co.uk
Website: www.qsl.net/gm6nx
The Stirling & District Amateur Radio Society are holding a mini radio rally at Menstrie Scout Hall, near Stirling. Doors open 1030. There will be traders, a Bring & Buy and lots more.

June 2

Dover Radio Club Rally/Boot Fair
Contact: Ian Keyser G3ROO
Mail: Rosemount, Church Whitfield, Dover, Kent CT16 3HZ
E-mail: g3roo@btinternet.com
The Dover Radio Club Rally/Boot Fair will be held at the Whitfield Village Hall. Doors open at 1000 and close at 1400. For more information contact the organisers.

June 9

The 6th Red Rose QRP Festival
Contact: Les Jackson
Tel: (01942) 870634
E-mail: g4hzj@btinternet.com
The 6th Red Rose QRP Festival takes place at Formby Hall, Alder Street (off High Street), Atherton, Manchester, from 1100 to 1600. There will be trade and club stands, including RSGB, GQRP, FIST, etc., plus Bring & Buy. Huge, free car park, disabled facilities, delicious refreshments at QRP prices! Talk-in on S22. Admission is still only £1. Some tables at £5, but please book early!

June 9

The 33rd Elvaston Castle National Radio Rally
Contact: Les Bagnall G4CWD
Tel: (01332) 559965
E-mail: les@g4cwd.demon.co.uk
The 33rd Elvaston Castle National Radio Rally is taking place on the Showground at the Elvaston Castle Country Park, near Derby. Admission is £5 per car (inc. passengers) or £15 per coach.

A comprehensive look at what's new in our hobby this month.

Dealer Incentive

Win For W&S!

It's great to see dealers and manufacturers working together!

Waters & Stanton PLC recently won a dealer incentive competition organised by Kenwood Electronics. Over the past 12 months ending in March 2002, dealers were offered an incentive to see who could achieve the largest growth.

As the photo shows Waters & Stanton PLC were very pleased to discover they had won! They were presented with a commemorative certificate and vouchers for a holiday in Africa at their premises on 11 April.

● (From left to right), Dave Wilkins G5HY from Kenwood, Peter Waters G3OJV and Jeff Stanton G6XYU of Waters & Stanton.

A Great Day Out!

Waters & Stanton Open Day

Why not take time out to attend the 12th Annual Waters & Stanton Open Day?

Sunday 26 May is the day Waters & Stanton will be putting up the Marquees, hunting out the bargains and rolling out the raffle prizes. Doors open at 10am and entry is free! Throughout the day there will be free food and drink on offer as well as a host of stock clearance items at bargain prices.

Representatives from Icom, Yaesu, Kenwood will be manning stands displaying their latest equipment ranges and will be on hand to answer your questions and demonstrate their products. If you fancy having a go at taking your Morse assesment then **Mark Francis** will be only to pleased to hear from you in advance to book your place.

So go on make a date in your diary and who knows you may find the bargain you've been searching for.

Waters & Stanton PLC,
22 Main Road, Hockley,
Essex SS5 4QS
Tel: (01702) 206835
FAX; (01702) 205843
E-mail: info@wsplc.com
Website: www.wsplce.com

Special Event

Wrexham Report

On Saturday 23 March, members of the Wrexham Amateur Radio Society ran a Special Event Station and exhibition of radio at the Wrexham Science Festival - here's how they got on.....

Members of the Wrexham ARS activated **GB2WSF** on 7 & 144MHz in a bid to bring the fascination of radio to visitors of the Wrexham Science Festival. They also demonstrated Morse, Airband, Data modes, ATV, and a webcam.

Throughout the day the club managed 110 contacts on h.f. (mostly UK) and 20 contacts on 144MHz and also used the DX Cluster to advertise the station. Despite all the activity they managed to talk to plenty of people on both sides of the microphone and so the club tells us "there were plenty of inquisitive minds stood behind you when you when you'd finished a QSO. We also took the opportunity to advertise our Foundation Licence course, and are just waiting on conformation of numbers".

Also on display was a table of older radio kit ranging from HROs to Codar CR70s, as well as a display of all manner of electronic kits built by club members, ranging from Electronic Dice to Signal Oscillators and a Ramsey 144MHz RX Kit. Thanks to our friends at PW Publishing there was even a table of *Practical Wireless* back issues, data cards, maps and charts for visitors to take away.

The Data Modes display consisted of a Packet radio demonstration, a Morse display, where the output from a Morse oscillator was fed into a PC so people could see what they were sending. There was also an oscilloscope demonstrating voice patterns, or r.f. modulation at the flick of a switch!

● Glyn MW0BNB (left) and Geoff GW0EMB take control of the h.f. station.

● Geoff GW6SBD/MW3SBD demonstrates Morse and talks to the public.

Icom and Kenwood also supported the Wrexham Club's efforts by supplying literature, posters, stickers, pens and promotional material for the raffle. The RSGB RLO for the area **Liz Cabban GW0ETU** and Deputy RLO **Dave Evans GW4GTE** were also on hand throughout the day.

Overall, the event was a great success and the club members hope to do it again next year - even bigger and better! They would like to thank all those who helped make the day such a success.

Wrexham Amateur Radio Society
Ian GW1MVL, Chairman
Tel: (07796) 185703
E-mail: gwlmvl@supanet.com
or
Mark 2W1MDH, Vice Chairman
E-mail: mark_harper@bigfoot.com
Website: http://www.qsl.net/gb2wsf

Titanic Remembered!

Over 2000 Contacts!

Ninety years have passed since the RMS Titanic met with her fate in the early hours of April 15 and in rememberance of those lost and Godalming's 'Local Hero' Jack Phillips, GB90MGY took to the air

The **Titanic Wireless Commemorative Group** in association with the **Guildford & District Radio Society** set-up a special event station in Godalming running from 1030UTC on 13 April until 0547UTC on 15 April (the precise time the last radio signal was received from the *Titanic*) with the commemorative callsign **GB90MGY** to mark the 90th Anniversary of the loss of the RMS *Titanic* and honour the memory of local man **Jack Phillips**, Chief Wireless Telegraphist on the liner.

The special event station, which ran on 3.5-28MHz c.w. only, was operated by 20 local enthusiasts from the Titanic Wireless Commemorative group. The Amateur Radio set-up consisted of:

- Kenwood TS-570
- Cushcraft R8 multi-band Vertical antenna for 7-28MHz operation
- Ameritron Amplifer
- NVIS trap dipole for 3.5MHz operation

Over the weekend GB90MGY made 2,685 contacts with more than 100 countries world-wide, including the Heritage Station at Cape Race (Newfoundland), ships at sea, DX (including Norfolk Island in the Pacific) and Titanic enthusiasts world-wide. A special souvenir QSL card, designed by **Alex Wickham G3XHK** and jointly sponsored by **Chris Rees G3TUX** will be sent out to all stations who QSL via the RSGB Bureau or direct ot G3XHK.

All-in-all the weekend was a huge success with over 500 people visiting the station and the Godalming museum, where an exhibition on the life and times of Jack Phillips and examples of historic Marconi equipment can be seen until 25 May 2002. For more information on the Titanic Wireless Commemorative Group contact: **Michael Shortland G0EFO, Tel: (01483) 426510** or **E-mail: msa-consult@dial.pipex.com**

If you wish to visit the Godalming museum or want to find out more contact the Publicity Officer, **Derek Watson** at the museum on (**01483) 426510** or via E-mail at: **museum@godalming.ndo.co.uk**

If you want to know more about the *Titanic* and the Jack Phillips story look out for a copy of the June issue of *Radio Active*, on sale 17 May priced £2.50. If you have difficulty obtaining a copy please send £2.50 (coins or postal order) to:
Donna Vincent,
Dept RA/T06,
PW Publishing Ltd.,
Arrowsmith Court,
Station Approach,
Broadstone, Dorset BH18 8PW

Summer Specials

Scarborough On Air!

Listen out and try to work the Scarborough Special Events Group in the coming months as they take to the air with several special callsigns.

Members of the Scarborough Special Events Group have a busy summer ahead with their planned special event stations. Listen out for them on:

May 18-19 - GB5SF
To commemorate the revival of the famous Scarborough Flyer train service from London to Scarborough, hauled by the steam loco *Green Arrow* **GB5SF** will be activated. The QSL shown here will be sent to all stations who make contact or send s.w.l. reports.

June 1-4 - GQ0OOO
In celebration of the Queen's Golden Jubilee GQ0OOO will be aired. A full colour official photograph of Her Majesty will be used as a commemorative QSL card.

August 17-18 - GB2SCA
As part of International Lighthouse weekend the Scarborough group will be operating as **GB2SCA** from the lamproom of the Scarborough Lighthouse.

Operation of all the above stations will be on 7MHz s.s.b., c.w., 144MHz s.s.b/f.m. and 430MHz. A help-line number - (07881) 542532 will be available during each weekend for those wanting advice or any QRP stations struggling to make contact. For more information contact **Roy Clayton G4SSH** via E-mail at **g4ssh@netscapeonline.co.uk**

amateur radio clubs

Keep up-to-date with your local club's activities and meet new friends by joining in!

BRISTOL
North Bristol ARC
Contact: Dick Elford G0XAY
Tel: 01454-218362
E-mail: g0xay@aol.com
The North Bristol Amateur Radio Club meets on Friday evenings at SHE7, Braemar Avenue, Northville, Bristol. The club offers RAE and Morse tuition and tests and as well as the part usual shack nights, chat nights and internal talks, there's the following of particular interest: **May 10:** The Bristol Avon - a talk by **Terry Mitchell**, **24th**: Organising The Longleat Rally by Shaun O'Sullivan G8VPG; **June 24:** The Foundation Licence - Dispelling The Myths a talk by Terry Mitchell and **July 19**: DXpedition to Madagascar - a talk by Phil Whitchurch G3SWH. Why not go along?

ESSEX
Chelmsford ARS
Contact: David Bradley M0BQC
Tel: (01245) 602838
E-mail: cars@g0mwt.org.uk
Website: http://www.g0mwt.org.uk/
The June meeting of the Chelmsford Amateur Radio Society has been **postponed** by a week to avoid clashing with the June Bank Holiday. The constructors competition will now take place on **Tuesday 11 June** at 1930hrs in the Marconi Social Club, Beehive Lane, Great Baddow, Chelmsford.

HEREFORDSHIRE.
Hereford Amateur Radio Society.
Contact: Roy Emes G3EPV
Tel: (01432) 761512
Hereford Amateur Radio Society meet on the 1st & 3rd Friday of each month at 1930 until 2130hrs. Meetings take place in the upper room of the Simpson Hall, Burghill. The village is situated about two miles outside Hereford City boundary, to the north west, and should be marked on most road maps. A friendly reception awaits both newcomers and old timers.

MIDDLESEX
Radio Society of Harrow
Contact: Jim Ballard.
Tel: 020-7278 6421 (daytime)/ (01895) 476933 (eves)
E-Mail: g0aot@thersgb.net
The Radio Society of Harrow meets every Friday from 2000hrs at The Harrow Arts Centre, Uxbridge Road, Hatch End, Middlesex. Forthcoming meetings include: **May 17:** Committee Meeting; **24th:** Junk Sale and **25th**: Airborne Antennas - come and see if we can get a working antenna up with our kites!

Edgware & District Radio Society
Contact: David G5HY QTHR
Tel: (01923) 655284 (days)
Meetings of the Edgware & District Radio Society start at 2000hrs and are held at the Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware, Middlesex. Why not join in with these June meetings? **June 13:** Surplus Equipment Sale and **27th**: VHF Field Day Briefing. All visitors and new members are always very welcome.

NORTHERN IRELAND
Bangor and District ARS
Contact: Mike GI4XSF
Tel: 0284-277 2383
Website: http://welcome.to/bdars
Bangor and District ARS Amateur Radio Society meet on the 1st Wednesday of every month in The Stables at Groomsport from 2000hrs. On Wednesday **June 6** the club are holding their annual BBQ & QRP evening. The venue for this meeting is the Scout Camp in Crawfordsburn Country Park. This should be a great night with lots of QRP fun and good food. Visitors and new members are (as always) most welcome.

Radio Basics

They might be very useful...but just what type of semiconductor device are we looking at? Don't worry, this month's Radio Basics aims to take the 'terror out of transistors' for everyone!

Rob Mannion G3XFD says that "Identifying what they are, and just what leads are which on semiconductors - particularly transistors - can be confusing". So, to help you sort out all mysterious connections Rob and Tex Swann G1TEX have been busy on your behalf!

Whilst the identification and use of resistors and capacitors have been well covered in the Radio Basics (RB) series recently....the same thing cannot be said for those all-important transistors! I was aware of this shortcoming....but I also realised that too much information at once can be more confusing than too little at times.

So, instead of providing reams of semiconductor base lead-out information...I've tried to minimise the problems obtaining components by sticking to designs using the fewest number of different types of semiconductor device. Those of you who have followed the RB series will know that most of my projects use the MPF102 field effect transistor (f.e.t.), the LM386 and as few other differing active devices with the aim of making 'shopping around' for components as simple as possible.

As we've dealt with and handled f.e.t.s frequently, and the associated lead-outs have been featured frequently in RB already, I'm concentrating on bipolar types. This is because (for the relatively inexperienced) when you're working alone and carrying out individual projects and experiments - **something I strongly encourage you to do** - having a simpler active device to hand and work with will make it less daunting. And as they're cheap and plentiful...it won't matter too much if you accidentally destroy an occasional transistor!

Even though he's always closely involved with every drawing and diagram for this series, I'm particularly grateful to **Tex Swann G1TEX/M3NGS** this month because he's provided all the photographs of transistors from his own stock. Thanks Tex!

Analogue Meter

For most purposes nowadays it's cheaper to buy and use a basic digital testmeter (where the reading are presented in numerical form) for constructional and test purposes. However, I personally feel that an old-fashioned analogue meter with a moving needle over a printed scale (usually termed as 'analogue') are better for simple continuity testing and comparative resistance checks, such as those we'll be undertaking when testing diodes and transistors.

Digital meters may well be

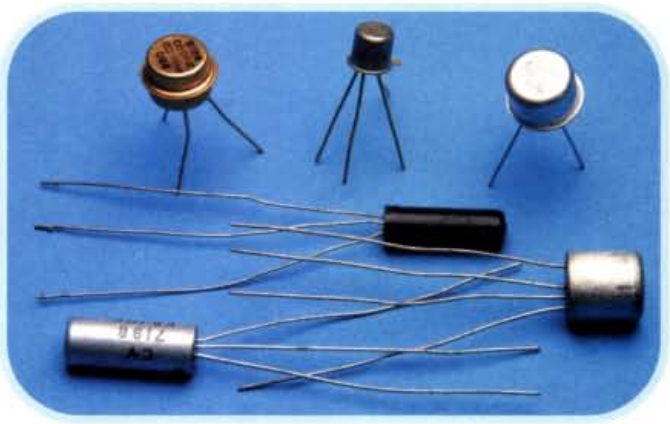


Fig. 1: Some of the older, more commonly found transistors. Those at the lower part of the photograph are even older and are most probably of the OC71, 72 etc., vintage (left metallic casing, centre black painted glass/plastic outer casing).

Fig. 2: Older, but still useful power transistors. Often found in power supplies (where they are frequently used as current regulators) in older audio amplifiers and in car radios. General warning - some types can contain toxic chemical compounds. However, they are quite safe unless unsealed by filing or sawing.

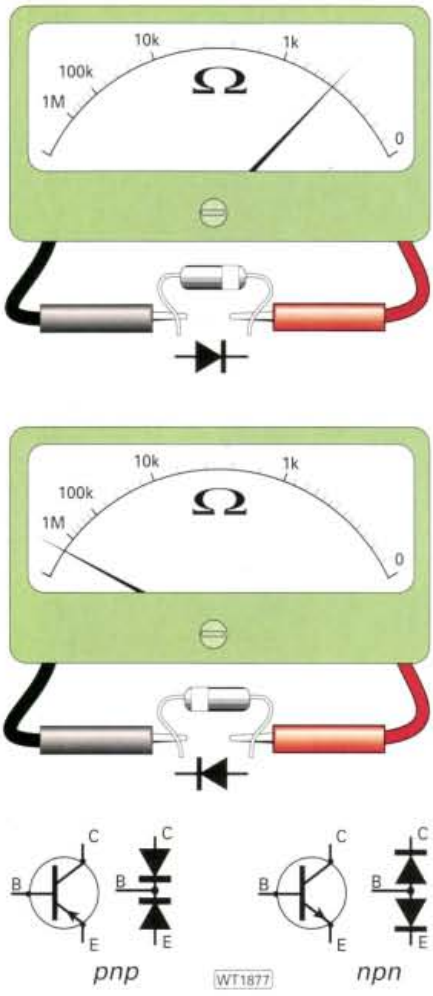
more accurate (generally speaking - depending on the quality of the instrument) but I feel that the ability to actually see the needle pointer 'swing' is very helpful.. especially to the inexperienced. You can compare it to the 'reading' of a traditional clock face and a digital clock. But there's nothing to stop you having both types of meter in your workshop...I use both types to advantage!

Reference Source

Regular readers will know that almost from the very beginning of the RB series I've recommended the book *Understanding Basic Electronics* (*UBE*), published by the **American Amateur Radio Relay League** (ARRL) as a superb reference source. Indeed, I think it's absolutely ideal for reference, training and general reading (**yes...it is very 'readable'...unlike many theoretical textbooks!**).

The *UBE* is available from our Book Store. I rate it as "**Very highly recommended**" and I'll be referring to it again later in this article, directing you to the chapter/sections required.

● Fig. 3: Specialised transistors - often used for v.h.f. and u.h.f operations or power applications. The tabs provide power connections, input/output and form part of the heat-sinking and 'short lead' technology approach necessary for v.h.f. and u.h.f. applications.



● Fig. 5: Using a traditional analogue multimeter to test diodes. The inset diagrams shows an extension of the same test to test bi-polar transistors using the same technique (see text).

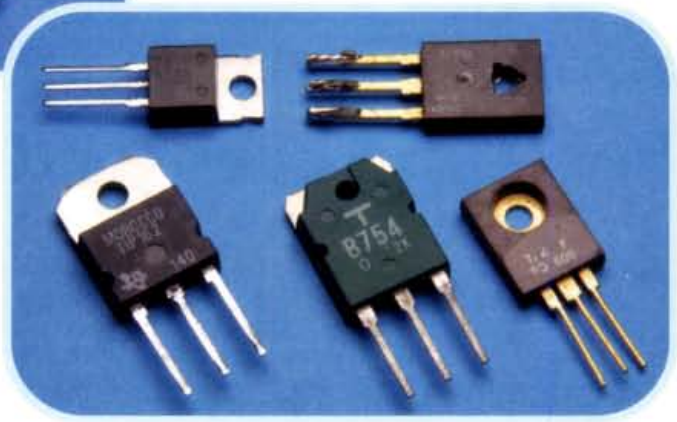
Looking At Transistors

By looking at the selection of transistors photographed by Tex, heading photograph, and in **Figs. 1**, **2**, **3**, and **4**, you'll realise just how different they can look physically. Fortunately though...when it comes to testing them it's a simple job as you'll see very soon.

For the purposes of this article, we'll be looking at the transistor only as simple diodes - hence the 'diode tests' which I'll be explaining very shortly. However, very soon in this series I'll be presenting an extremely simple transistor tester which will identify whether or not it's a negative-positive-negative (*npn*) or positive-negative-positive (*pnp*) type (**see last paragraph***) of device being examined.

The simple tester will also provide a quick 'okay' (or 'Go - No Go' test) check and an indication of the useful gain provided by the device. It will prove very useful in your workshop.

* In the meantime, as this series is aimed at **being practical** rather than **purely theoretical** - I strongly recommend you read the superbly written sections dealing with semiconductors in *UBE*. The relevant sections are in Unit 4, sections 26-3, 26-5, 26-11 in Chapter 26, and 27-1, 27-3 in Chapter 27. These will provide the basics on diodes and bi-polar transistors. (If you don't have a copy of *UBE* - any Amateur Radio theory manual will help...although I feel that the ARRL book will be the best teacher you can get!).



● Fig. 4: Plastic power transistors - the heat sinking tab (prominent on the two examples on the left) is constructed so that they may be attached directly to a suitable heat sinking area.

The Diode Test

In the days when 'Goody Bags' of semiconductors were on offer at shows and rallies - the first check which had to be done on arriving home was to ensure the bargain diode, or bi-polar transistor was not in fact 'open circuit' (because they were mainly manufacturer's rejects this was a necessary check - and still is when you buy untested components).

The diode test is simple to perform and it can be carried out using a simple diode, as in **Fig. 5**, or with a transistor. In the case of an ordinary signal diode (same type as described in earlier articles featuring simple receivers, with cathode identifier band) you can follow the diagrams.

The test set-up shown in Fig. 5 assumes the use of a traditional analogue meter. When using a digital multimeter, the leads are reversed for this test. This difference is due to the way the meters work and is beyond the scope of this article.

If you do not get a resistance reading, or it's more than 100Ω or so in the 'forward' (top diagram in Fig. 5)...reject the diode. In the reverse direction test (lower diagram in Fig. 5) generally speaking - the higher the resistance reading the better.

However, if you're evaluating a diode for a 'crystal set' by far the best test is a reception test carried out 'on air' with a good antenna. In fact, I recommend you try both methods...and compare the best diodes on air performance with its forward/resistance tests. Then do the same with a poor performer...noting the results once again.

Next, try the diode test on a bi-polar transistor. In many cases you'll find that the centre lead-out wire is the **Base** (B). In a *pnp* type the Base will form the common 'cathode' (for our purposes) and on an *npn* type it will form the common anode.

Carry out the diode test first to ensure a diode/junction exists. Once this has been done base to emitter, and then base to collector, and its successful you can then find out which way the 'internal diodes' are (as shown in the transistor circuit symbol lower insets) and determine whether or not you're dealing with either a *pnp* or *npn* device.

Familiarise yourself and when we build our transistor tester (soon) the knowledge will be very useful! Cheerio until next time. *PW*

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Sportcat twin turbo. Easy to programme - turbo scan handie. 25-956MHz (with gaps). CTCSS/DCS tone facility. Alph numeric display. Turbo search - 300 steps/sec. Incl's batts/charger.

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DJ-X10 .....Sale price £249.00

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8-meg card sale	£39.99
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500kg brake winch.
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Superb quick fit dash mount for hand-helds. £9.99.
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3 for **£10.00** P&P £3.50

The Royal Internatic

£900 WORTH OF TICKETS TO BE WON!

Experience sensational flying over the skies of RAF Fairford on 20/21 July as the Royal International Air Tattoo 2002 celebrates the Golden Jubilee of Queen Elizabeth II. Enter our competition for the ultimate aviation experience of the year!

To be in with a chance of winning a pair of the **15 pairs** of tickets on offer all you have to do is complete the wordsearch, find the missing word, fill in the form and send your entry to ***Practical Wireless*, RIAT Competition, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW** by **1 July 2002.** Photocopies of the form are acceptable, but please remember to include the corner flash.

So what are you waiting for? Post your entry today!

Golden Jubilee

The world's best pilots are set to go vertical for eight non-stop hours of sensational flying. After two years away, the Tattoo is making a big comeback to RAF Fairford - 450 aircraft, hot air balloons, stalls, exhibits, road shows and virtual reality rides.

To mark the Golden Jubilee of Queen Elizabeth II the Royal Air Force Red Arrows will give a superstar performance, soaring into a special routine dedicated to Her Majesty. The show will open with an all-British flypast of *Hunter, Harrier, Nimrod* and *Tornado* aircraft, together with the 21st Century Eurofighter, to symbolise the five decades of The Queen's reign.

Stars of the Show

Demonstrating perfect symmetry between man and machine, the RIAT flying display is a showcase for the world's Top Guns. Tattoo visitors will take a front row seat for the aviation supershow - sizzling solo jet routines, gravity-defying helicopter manoeuvres, astounding aerobatic teams, massed flypasts, airborne set-pieces and the enduring magic of the *Spitfire* and other vintage aeroplanes.

Bomber Crews Salute

The RIAT 2002 will pay tribute to bomber crews from all nations, past and present, both in the air and on the ground. An awesome array of aircraft will see Russian-built bombers lining up alongside United States Air Force B-52s, B1-Bs and Stealth aircraft. It's also hoped that a mighty Vulcan bomber, in her heyday one of the West's most potent Cold War forces, will be restored in time to make a triumphant appearance at the Tattoo.

In rememberence of the bomber crews who will never return, the RAF Battle of Britain Memorial Flight Lancaster, the world's only flying Blenheim and a rare B-17 Flying Fortress will perform a memorial flypast watched by wartime campaigners, visiting aircrew and tens of thousands of airshow visitors. The Flying Fortress, star of the feature film *Memphis Belle*, will represent the United States Eighth Air Force on its 60th Anniversary.

Timetable

The public gates to RAF Fairford (located near Swindon on the Wiltshire/Gloucestershire border) open at 0730 on Saturday & Sunday 20th/21st July. The flying displays start from 1000 to 1800hours, followed by the Jubilee Proms Concert. There will be a regular airshow shuttle bus service from Swindon Bus Station.

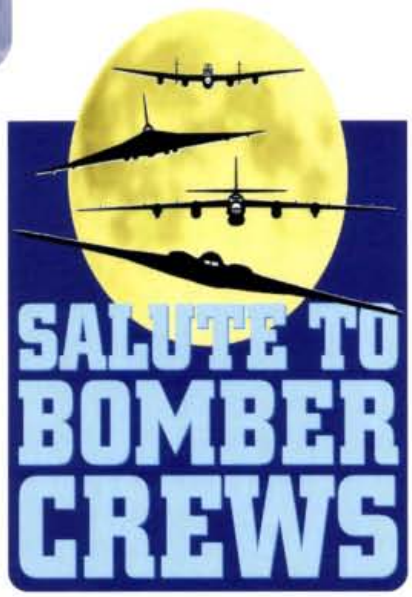
Tattoo Tickets

Adults tickets in advance are £24.95, on the day £30. Children under 16 free. Parking on the day is free.

Extra Options:

Plane Crazy

The Friends of the Royal International Air Tattoo won't miss a single Tattoo moment, from the first arrival on Wednesday 17 July to the last departure on Monday 22 July. The six-day package for aviation fans includes pre-show access to the airfield. Adult subscription £110, children £55.



THE ROYAL INTERNATIONAL AIR TATTOO

2002 50

CELEBRATING HM THE QUEEN'S GOLDEN JUBILEE

THE ROYAL IAT INTERNATIONAL AIR TATTOO

Competition Time!

Seventeen of the 18 words below have been hidden in the wordsearch grid. They have been printed across (forwards or backwards), up and down, diagonally, but they are always in a straight line without odd letters between. You can use the letters in the grid more than once for different words. Once you have found the missing word, enter it on the coupon and send it, along with your name and address (photocopies accepted with the corner flash) to our editorial address.

HARRIER
TORNADO
NIMROD
EUROFIGHTER
TATTOO
BALLOON
FAIRFORD
RED
ARROWS
JUBILEE
GOLDEN
BOMBER
CONCERT
SALUTE
FIFTY
ANNIVERSARY
VULCAN
ROYAL

S	Q	T	I	S	U	O	C	G	Z	O	V	E	U
W	O	N	Y	A	W	R	B	O	C	V	E	L	F
O	A	O	G	L	Y	C	E	M	N	L	Q	A	J
R	H	O	H	U	T	S	K	B	I	C	I	Y	W
R	W	L	E	T	F	C	E	B	M	R	E	O	P
A	U	L	W	E	I	C	U	B	F	O	S	R	M
C	L	A	K	L	F	J	Y	O	J	U	B	S	T
D	Q	B	Y	R	A	S	R	E	V	I	N	N	A
E	X	C	J	F	P	D	U	C	L	N	N	I	X
R	X	T	A	N	G	O	L	D	E	N	U	M	K
R	E	T	H	G	I	F	O	R	U	E	W	R	E
A	K	A	H	A	R	R	I	E	R	A	Z	O	U
D	A	I	A	P	U	Z	T	O	R	N	A	D	O
T	P	K	S	V	U	L	C	A	N	A	Z	C	X

Send your entry (photocopies acceptable with corner flash) to: **Practical Wireless, RIAT Competition 2002 PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW**. Editor's decision on the winner is final and no correspondence will be entered into.

Entries to reach us by Monday 1 July 2002

RIAT COMPETITION 2002

The missing word is:.....

Name .....

Address .....

.....

Tel: .....

E-mail: .....

...nal Air Tattoo 2002

Aviation Club

Marquee with private grandstand and garden overlooking the runway. All for the inclusive price of £98 per guest including RIAT admission, lunch, morning coffee and afternoon tea.

Waitrose Jubilee Garden

Traditional deck chair enclosure, offering a selection of summer refreshments. Advance tickets £13 per person (does not include RIAT admission or food and drink), £16 on the day.

The Leisure Vouchers Public Grandstand

Reserved seating, great view of the flying display. Advance tickets £13 per person (does not include RIAT admission), £16 on the day.

Park & View

Count in the aircraft as they arrive for the Tattoo from Wednesday 17 July to Friday 19 July and watch them take off for home on Monday 22 July. Two Park & View enclosures - advance tickets £9 per person.

PW RIAT COMP 2002

The Icom IC-7400 HF & VHF Transceiver

Even though he's on a training course, Richard Newton G0RSN couldn't miss out on the chance of trying the latest offering from Icom. And despite antenna limitations... Richard thoroughly enjoyed himself!

I've not been so active since I moved house at the end of last summer and have not yet managed to set up a new shack! So, I was delighted to be asked by *PW* to take a look at the IC-7400, a new multi-mode transceiver offering general coverage receive and c.w., a.m. s.s.b., RTTY, and narrow band f.m. (n.b.f.m.) on h.f. and also the 50 and 144MHz bands.

The IC-7400 is the successor to the established Icom IC-746 transceiver (which I reviewed for *PW* back in November 1998). I remember being very impressed indeed by the '746 and so was keen to try the new rig.

Very Similar Looks

Opening the box I saw that the Icom IC-7400 was very similar to its predecessor in looks. The distinctive large screen and wonderful display were there and the controls were laid out in an easy-to-follow and well designed way.

There are two 50Ω SO239 coaxial sockets for h.f./50MHz antenna systems and one 50Ω SO239 socket for connecting the 144MHz antenna together with a grounding connection and 13.8V d.c. power socket.

There are two **accessory** connections and a mini DIN for a dedicated data connection, and a dedicated connector for the optional **external** antenna tuner, and straight or bug type (c.w) key and the external speaker jack plug sockets. Phono type coaxial connectors are provided for a linear amplifier to be connected.

The front of the Icom IC-7400 carries the controls for the radio along with sockets for external headphones and an external paddle key to operate the built-in electronic keyer.

All the controls for the main functions are large and well labelled. It's smart and professionally finished and definitely 'looks the part'. In operation the controls are positive and the tuning dial spins and turns with a reassuringly well-balanced feeling of weight.

Included in the smaller and less accessible controls are

things such as output power and other adjustments that you might set and then leave. These include functions such as key speed, c.w. pitch and microphone gain which you would want hidden away slightly to reduce the chance of accidental operation.

Those familiar with the Icom IC-706 or IC-746 - will definitely see some similarities here. At this point I have to say that the radio is very 'user friendly'...even for those who are new to the multi-layered menu system.

It's so difficult to decide where to start with radios like the IC-7400. The operator is offered so much!

What's On Offer?

So, let's have a good look at what the Icom IC-7400 has to offer. Features include an internal c.w. electronic keyer with memory capability, an internal automatic antenna tuner (a.a.t.u.), a 32-bit floating DSP noise reducer which is extended to a DSP intermediate frequency (i.f.) filter and an auto notch filter.

The transmitter is capable of 100W output power on all bands, except when in amplitude modulation (a.m.) transmission mode where the maximum is 40W. Power is variable from just less than 5 up to the 100W maximum. Receiver and transmitter incremental tuning (RIT) is provided within a frequency range of ±9.99kHz. On 50 and 144MHz CTCSS tone functions are provided together with a repeater tone burst, memories and scanning options.

To mention all the controls would be very near impossible in the space available here. So I'll concentrate on those of main interest.

The Digital Signal Processing (DSP) is used for the received audio and on the transmit side. The transmitted audio can be changed by selectable transmit audio pass band widths, these are 2.8kHz which gives very full audio, 2.4kHz (which the manual says is useful for operators with very deep voices) and the 2.2kHz setting...good for breaking through DX pile-ups.

The transmitted audio can be further adjusted by the use of what Icom call the **Microphone Equaliser**. This is where the operator can adjust the bass and treble of the transmitted audio. This is all in addition to the compressor which (based on on-air tests and reports) seems to enhance the transmitted audio very effectively indeed.

For my part I felt that the ability to fine-tune the all-important transmitted audio was excellent. Although I didn't take a great deal of time setting it up...I still got some great results that I'll share a little later.

The Icom IC-7400 also uses the DSP technology in the **Twin Pass Band Tuning** (TBT) function. This electronically narrows the pass band width by shifting the i.f. to slightly outside of the i.f.'s filter pass band to reject interference.

Moving both the **PBT** controls in the same direction has the effect of shifting the i.f. With a little practice this is a very effective tool for use in reducing the interference suffered where a strong adjacent frequency signal is present.

The Icom IC-7400 has three pass band width i.f. filters for each mode. According to the manual the pass band for the s.s.b. and c.w. modes can be set within a range of 50Hz to 3.6kHz. This can be done in 50 or 100Hz steps, and provides a total of 41 pass band widths.

For the RTTY mode the pass band width can be set within a range of 50Hz to 2.7kHz in 50 or 100Hz steps, giving a total of 32 pass band widths. The n.b.f.m. and a.m. modes have three fixed pass band widths which are independently available.

There's also a built-in 100kHz calibrator...and the default setting on the model I had was 'On'. So, the strong '100kHz sproggie' I found was soon sorted when (by selecting the appropriate menu) the calibrator was switched off. It's unusual to have it 'on' rather than 'off' though - **but if in doubt...read the manual I say!**

● Rear panel view of the transceiver

Demodulator For RTTY

Perhaps the most interesting function I found was the RTTY demodulator and decoder which Icom have built-in. This means that for decoding Baudot an external terminal unit is not required.

The transceiver will decode and display the text on its main display screen, and it has a twin peak meter to assist tuning. This meter changes the receive frequency response by boosting the 2.125 and 2.295kHz frequencies for improving the chances of copying the desired RTTY signal. Obviously, additional equipment to transmit RTTY is needed, but I thought that it was a wonderful idea to include the decoder.

Pre-Programmed Bands

Amateur bands on the IC-7400 are all pre-programmed into a keypad on the front panel. Three memories are allocated to each band - referred to as **Stacking Registers** and are overwritten on a rotational basis, 'remembering' the last three operational frequencies and modes.

An example: I selected the 14MHz band by pressing the **Band** button, resulting in **14.325MHz USB** being displayed. There was an interesting station...but I wanted to quickly tune the band. I then pressed the same button a second time and used this setting to tune around.

By pressing it a third time I checked around 14.150MHz in RTTY mode, for any teletype activity. Having found nothing I pressed the same button again, and this took me directly to 14.325MHz USB.

You may also be wondering how easy the radio would be to actually operate...but fear not! The IC-7400 **is very user-friendly and the manual is extremely easy-to-follow and is well written**.

Away From Home

I was keen to see what the Icom IC-7400 could do on the

Product

Icom IC-7400 100W h.f., 50 and 144MHz transceiver.

Company

Icom (UK) Ltd

Contact

Tel Sales: (01277) 741741

Pros and Cons

Pros: I am certain the Icom IC-7400 will be just as popular as the IC-746. It's a relatively compact and certainly portable rig (see below). Due to its very forgiving a.a.t.u. and variable power settings it lends itself to portable working as I experienced when doing the review.

Cons: The rather large current drain the IC-7400 has, even on receive, does not lend it to working from a battery power supply.

Price

£1568.63 inc. VAT

Summary

Providing you have a good power supply I think that this radio will give you excellent service wherever it is situated. It is, in short, a lovely radio.

Thanks

My thanks go to **Icom (UK) Ltd., Sea Street, Herne Bay, Kent CT6 8LD. Tel: (01227) 741741, FAX (01227) 741742**, for the loan of the review unit.

Richard G0RSN (In his father-in-law's shack) thoroughly enjoying himself on 144MHz using the Icom IC-7400. (Photo courtesy of Terry Wood G7VJJ/M3TJW)

air. However, I'm away from home at the moment on a course in Bramshill near Hook in northern Hampshire and have a small room in an accommodation block, which is on the third floor.

The IC-7400 was only available for a limited time so I had to find a suitable antenna. My first idea was to borrow a dipole from my father-in-law, **Terry G7VJJ/ M3TJW**.

The Icom IC-7400 was then set-up my room's desk and I attempted some antenna erecting. Fortunately, there were several large trees outside the 3rd storey window...but it was not going to be easy to support the dipole centre.

Eventually I erected the dipole (10 metres long on each leg) but feel unsure about sharing the following information with you! This is because the antenna ended up with one leg draped around the room, over the wall light, through the high cupboards and ended dangling down into the sink! The other leg I threw out of the window and hoped for the best.

Next, falling to temptation, I put the IC-7400's auto a.t.u. (a.a.t.u.) to the test and went on...hitting the tune button and getting onto 7MHz. The IC-7400 whirred and whizzed and soon a 1:1 v.s.w.r was showing on the multi display.

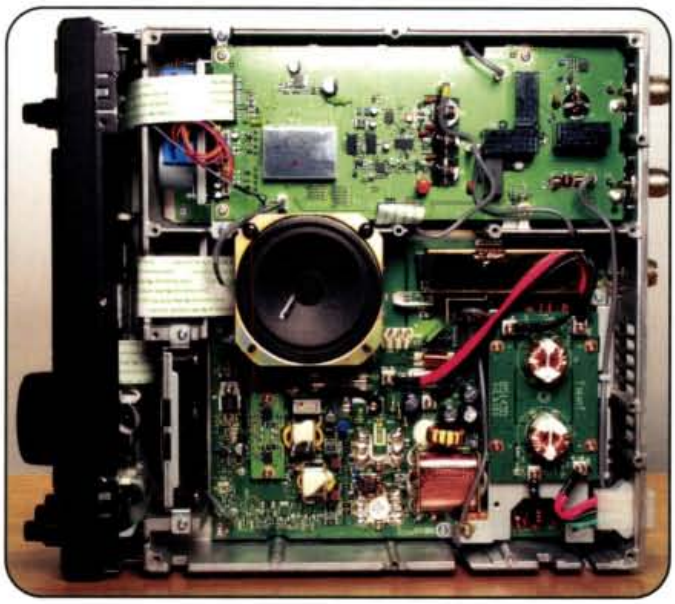
I wasn't sure whether to be impressed or downright scared that the a.a.t.u would tune an antenna system (I use the term in the loosest possible sense) such as my 'Bramshill Bodge'!

The problem then came when I heard **Ray HB9VW** from Bern in Switzerland on 7.066MHz. What a massive signal...so throwing all caution to the winds I called him, and we had a very enjoyable chat and received a 5 and 6 report. Ray was 5 and 9 + from his home 32km (20 miles or so) North West of Bern. Success!

Back & Prepared

The following week I went back to Bramshill prepared and took my 20 metre (66ft) long wire with magnetic balun. This was easily strung from my window to a nearby tree, although it sloped downwards.

on 7MHz and found **James GM4MKU** and **Chris GM4ZJI** in QSO on 7.056MHz. I called in and they were kind enough to allow me into their contact...James was a 5 and 9 signal from Lossiemouth in Morayshire and Chris was 5 and 7 from Glenrothes near Fife. I had some problems due



Inside top view of the IC-7400.

Next, I connected the antenna to the IC-7400 with the longer coaxial cable lead that I'd remembered to bring along, and set about tuning around. The a.a.t.u made it almost too easy...and in seconds it tuned up on 7, 14, 18, 21 and 28MHz.

Tuning to 21MHz and heard **Vijay VU2VVP** (India), unfortunately despite his being a terrific signal with me I was unable to break into the pile-up. I was however, impressed at hearing India!

Next, I tuned up the band and found VO1...a callsign prefix I've never heard before. The station was **Mark VO1ONE** from Newfoundland, Canada. Mark was providing a good 5 and 5 and gave me a 5 and 3 report and was running 100W from an Icom IC-706 **and a mobile whip from his stationary vehicle**. We had a very enjoyable chat until the QSB beat us and he faded away.

Bedtime approached, so I decided to have one more try to strong adjacent frequency signals, but the pass band filter was soon put to good use.

Chris and James both gave me favourable reports on the audio quality from the IC-7400. James said, "The audio is excellent, clear, sharp and punchy". Chris commented, "It's superb audio".

The audio was so good that James even correctly identified that I was trying to keep my voice down, as I'd now noticed the time and expected a sharp bang on the wall from my neighbour at any moment! I thanked James and Chris for their time and went to bed.

Up & Early

Next morning, Spurred on by my first ever contact into Newfoundland and my splendid QSO to Scotland I decided to get up early and try out my luck on 14MHz. I had almost given up when I heard, **Chuck WD9GWG**, providing a large 5 and 8 signal from

Osceola, Polk County, Wisconsin in the USA. He was running 400W from a Yaesu FT-1000.

You know the great thing about Amateur Radio is the terrific people you 'meet' on the air. Chuck and I had a wonderful talk...so interesting I almost missed breakfast!

Chuck reported that the audio from the IC-7400 was "Really good and "Rather mellow". He then complimented the rig for "doing a really good job" and sounding "nice and crisp".

Later that day I had a sked with my Father-in-Law Terry, G7VJJ using his new M3 call sign, M3TJW on 7.067MHz where exchanged 5 and 9 reports. I was running about 80W and Terry his maximum 10W from his Icom IC-706 Mark II into his wire dipole. The distance from Bramshill to Terry's QTH in Bournemouth is about 97km (about 60 miles).

Terry complimented the IC-7400, saying that it was "A beautiful signal, baritone audio, very listenable to". He also commented that "It really is lovely audio Richard".

In Bournemouth again I decided to enlist Terry's help in the next phase of the testing for the Icom IC-7400 on 50 and 144MHz so I asked Terry if I could use his shack and of course he was keen to help. We connected the transceiver to his 3-band antenna for 144, 50, and 430MHz. We had no luck at all on 50MHz, and running out of time decided to concentrate our efforts on 144MHz.

Our first contact was on 145.475MHz n.b.f.m. with **John G8UXW**, in Woodfalls just outside Salisbury, a distance of about 40km (25 miles). He was using a Yaesu FT-726R with a GP15 tri-band antenna at 10 metres (30 feet)...a good signal with us and he said that the audio from the IC-7400 was "quite punchy".

The next contact followed immediately when **John G1WSN** from Ibsley, Hampshire, in the New Forest, called us. He was about 20km (12 miles) away and using a hand-held with a telescopic whip and was trying out his Kenwood TH-75E, having first called us on the 500mW low power setting.

John increased his power to 5W and we exchanged favourable reports before his batteries failed. The fact that we had made the contact with John and his low power (and telescopic whip) has got to be a testament to both his transceiver and the IC-7400!

Next, a good friend of mine, **Steve Rann G1YNY**, called from his QTH in Mudeford near Christchurch, Hampshire, a distance of about 12km (7 miles). We reduced our 100W to a more reasonable 20 and exchanged good signal reports with Steve commenting that "The audio is good".

Terry and I then decided to try our luck on 144MHz s.s.b. A "CQ" call brought a reply from **Martin G8OFA** in Laverstock near Salisbury about 45km (25 miles) away. We went to 144.285MHz and had an extremely enjoyable contact with Martin receiving comments "Beautiful signal" and..."The audio is excellent, natural and well modulated". He then tuned either side of us while we were transmitting and reported, "The signal is very tight" (on bandwidth). Incidentally, Martin was using an Icom IC-706 MkII.

Final HF QSO

Terry and I decided to take a final look at 21MHz before wrapping up the tests. We heard **Rudy K2MVW** from Princetown, New Jersey in the USA on 21.320MHz.

Rudy gave us a 5 and 6 report and the comment..."Very nice audio, no problem at all" - without using his pre-amplifier on his Icom IC-781 which was running with a linear amplifier and providing 1.5kW into a 14-element beam! This was a fitting end for a very enjoyable and all too quick encounter with the latest rig from Icom.

PW

Manufacturer's Specifications

These are for the Europe version intended for use in Great Britain, Germany, Sweden, The Netherlands, Austria, Luxembourg, Finland and Ireland.

General Frequency coverage in MHz

Receive	0.500 – 29.999 50.000 – 54.000 144.000 – 146.000
Transmit (All Amateur bands 1.8 to 144MHz).	
Mode	c.w., a.m., s.s.b., n.b.f.m. and RTTY
Memories	99 regular, two scan edge and 1 call
Usable temp	-10°C to 60°C
Frequency Stability	Less than ± 7 ppm from 1 min
to 60 min after power on. After	that less than ± 1 ppm/hr at 25°C
Frequency resolution	1Hz
Power supply	13.8V d.c. ± 15% negative ground
Current drain	(Transmit) max 23A (Receieve) Standby 2.2A, 3A (at max audio out)
Dimensions (mm)	287 x 120 x 316.5 (WHD)
Weight	9kg
Transmitter	
Output power (Watts)	
Continuously adjustable	<5W to 100W (a./m. 5 to 40W)
Modulation systems	
s.sb.	PSN modulation
a.m.	Low power modulation
n.b.f.m.	Phase modulation
Spurious emissions	50dB (h.f.) 60dB (50/144MHz)
Carrier suppression	40dB
Unwanted sideband	55dB
Microphone impedance	600Ω

Receiver

Receiver Type	Triple conversion superheterodyne
Intermediate frequencies	1st 64.455MHz 2nd 455kHz 3rd 36kHz
Sensitivity	
SSB/CW/RTTY	0.16mV (1.8 – 29.990MHz)
Pre-amp on	
(10dB S/N)	0.13µV (50MHz) Pre-amp on 0.11µV (144MHz) Pre-amp on
AM (10dB S/N)	13µV (500kHz – 1.799MHz) 2µV (1.8 – 29.990MHz) Pre-amp on 1µV (50/144MHz) Pre-amp on
NBFM (12 dB SINAD)	0.5µV (28-29.990MHz) 0.25µV (50MHz) Pre-amp on 0.18µV (144 MHz) Pre-amp on
Selectivity	
SSB (BW 2.4kHz)	>2.4kHz/-6dB <3.6 kHz/-60 dB
CW (BW 500Hz)	>500Hz/-6dB <700 Hz/-60dB
RTTY (BW 350Hz)	>360Hz/-6dB <650Hz/-60dB
AM (BW 6kHz)	>6kHz/-6dB <15kHz/-60dB
FM (BW 15 kHz)	>12kHz/-6dB < 20kHz/-60dB
Spurious image rejection ratio	
(Except i.f. through on 50MHz)	>70dB >60dB (144MHz)
Audio output	> 2W (at 13.8V d.c. with 8Ω load)

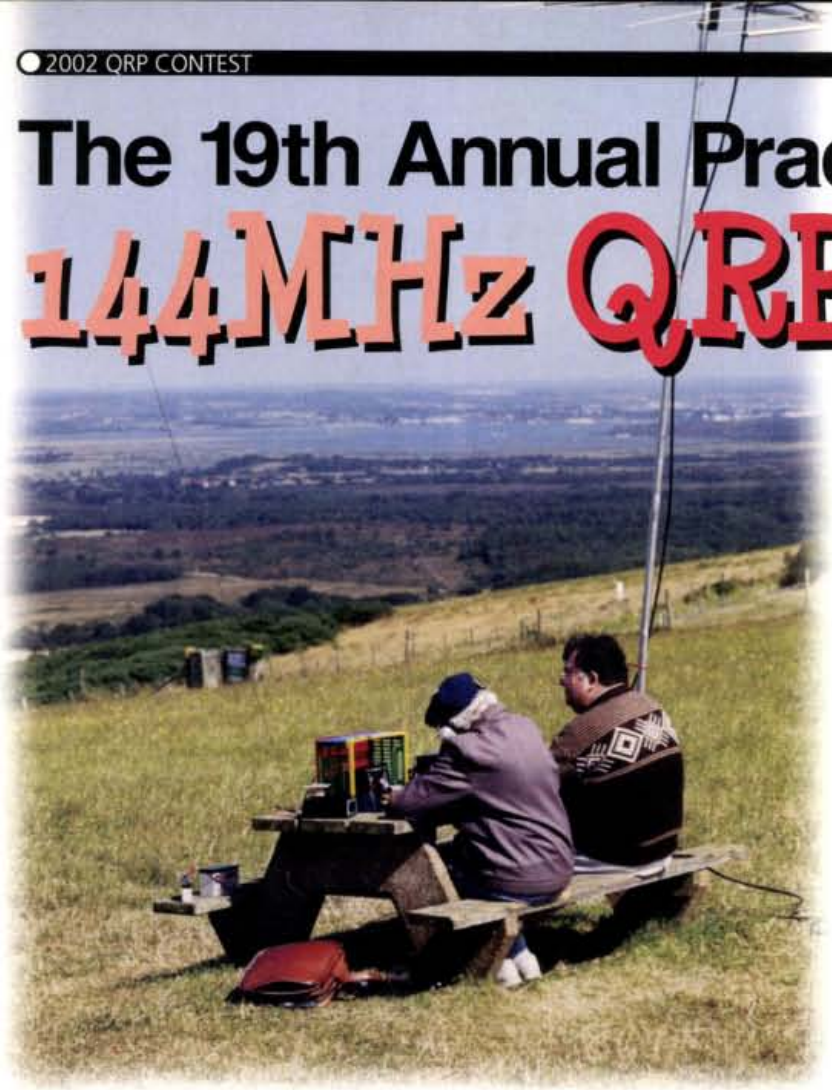
Antenna Tuner

Matching impedance	
Range	HF Bands 16.7 to 150Ω unbalanced (less than v.s.w.r 3:1) 50MHz 20 to 125Ω unbalanced (less than v.s.w.r 2.5:1)

Feature

The 19th Annual Practical Wireless 144MHz QRP Contest

0900-1600UTC, Sunday 16 June 2002



Editor's acknowledgement: It's my pleasure- once again - to thank Neill Taylor G4HLX for the tremendous amount of hard work he puts into organising the *PW* 'fun' event. Let's reward him by making it a fantastic day! Thanks Neill...and good luck everybody. ***Rob Mannion G3XFD.***

The *PW* Editorial Team are delighted to welcome Contest Organiser and Adjudicator Dr. Neill Taylor G4HLX back to his usual June space - following last year's cancellation - where he's about to invite you to join in the very special 2002 144MHz QRP Contest.

It seems a long time since we enjoyed a 144MHz QRP Contest. The restrictions due to foot and mouth disease last year led to the cancellation of the contest, as well as most other portable contests in the UK in 2001.

So, it's two years since the last *PW* Contest, the 'Millennium Special', and regular *PW* Contest operators will be eagerly looking forward to getting back on the air from their favourite hill-top sites on **Sunday 16 June**. And I'm glad to say that it will be another special: in celebration of the 70th anniversary of *Practical Wireless*, we are again offering a special certificate to every entrant.

Whether you are a complete newcomer to v.h.f. contests, or part of a well-established group, or maybe just a QRP operator who'd like the chance to work some long distances, the *PW* 144MHz QRP Contest has something to offer you. The 3W output power limit makes it easy to compete effectively, and year after year operators are amazed by the distances they achieve with low power. If you've never tried v.h.f. contesting before, this is an ideal way to start.

You probably won't need any encouragement to take part in the contest and do your best. But nevertheless we have an array of trophies and prizes to give you something to aim for!

The overall winners will receive the ***PW* QRP Contest Winner's Cup**. The leading Scottish station will be awarded the **Tennamast Trophy in Memoriam to Frank Hall GM8BZX, sponsored by Tennamast Scotland Ltd**. The leading station in Eire or Northern Ireland wins the ***PW* EI/GI Trophy Clock**, sponsored by our Editor, **Rob Mannion G3XFD/EI5IW.**

The ***PW* Beginner's Trophy**, sponsored by myself, is awarded to the leading newcomer. To qualify for this the highest licence class you hold must be either Foundation or Intermediate (Novice), and you must have been licensed for no more than two years.

As he's done in the recent past, **Mike Devereux G3SED** of **Nevada, Portsmouth** has come up with an interesting choice of award for the First Prize winners in the shape of a Trident v.h.f. antenna.

Bob Keyes GW4IED of **Key Solar Products**, another long time supporter of the contest, will present a 12V 5Wp solar panel for the low power operator winning the Runners Up 2nd prize, from his range of 'alternative energy' products.

Published Results

As usual, the published results will highlight the leading single operators, the leading stations using a single antenna, and the leading stations in each locator square, and each of these will be awarded a certificate marking the achievement.

Additionally, as a special bonus in *PW*'s 70th anniversary year, every individual or group entering the contest can receive a special certificate stating their position in the results table. The commemorative certificates are sponsored by **Chris Rees G3TUX** of **The QRP Component Company**.

Important Note: **To receive your certificate, be sure to send the corner flash on this page with your entry. (No photocopies please)**

New To Contests?

If you are new to v.h.f. contests, you may like to look at some of the introductory advice on the *PW* Contest website, **www.contest.org.uk** There you'll also find an archive of results from previous QRP contests, log sheets to download, and other information.

There's also advice to help you with sending your entry by E-mail. However, traditional entries on paper, sent by post, are also welcome.

As usual, the first four hours of the contest coincides with the second session of the RSGB 144MHz Backpackers' Contest, and the QSO exchange is the same, so if you are sending an entry to both contests, sorting out your logs should be straightforward.

The rules of the *PW* contest, provided at the end of this article, **must be read by everyone taking part - all operators in the case of group entry - especially because it's probably two years since you last saw them! Please** check them again before sending your log in, to be sure that you have included everything needed.

So, let's hope that we are fortunate with the weather and the v.h.f. propagation, and I look forward to working many entrants myself. Good luck and have fun!

Neill Taylor G4HLX

QRP CONTEST 2002

Contest Rules

1. General

The contest is open to all **licensed** Radio Amateurs, fixed stations or portable, using **s.s.b.**, **c.w.** or **f.m.** in the **144MHz (2m) band**. Entries may be from **individuals** or from **groups or clubs**, etc. The duration will be from **0900 to 1600UTC on 18 June 2000**.

All stations must operate within the terms of the licence and entrants must observe the band plan and must keep clear of normal calling frequencies (144.300 and 145.500MHz) even for CQ calls. Avoid frequencies used by GB2RS during the morning (144.250 and 145.525MHz) and any other frequency that is obviously in use for non-contest purposes. **Contest stations must allow other users of the band to carry out their activities without hindrance**.

The station **must use the same callsign throughout the contest** and **may not change its location**. Special event callsigns may **not** be used.

2. Contacts

Contacts will consist of the exchange of the following **minimum** information:

(i) callsigns of both stations;
(ii) signal report, standard RS(T) system;
(iii) serial number: a three digit number incremented by one for each contact, starting at 001 for the first;
(iv) locator (i.e. full six character IARU Universal Locator for the location of the station).

Information must be sent to, and received from, each station individually and contact may **not** be established with more than one station at a time. **Simultaneous operation on more than one frequency is not permitted**.

If a non-competing station is worked and is unable to send his full universal locator, his location may be logged instead. However, for a square to count as a multiplier (see rule 4), a full six character IARU universal locator must have been received in at least one contact with a station in the square.

Contacts via repeaters or satellites are not permitted.

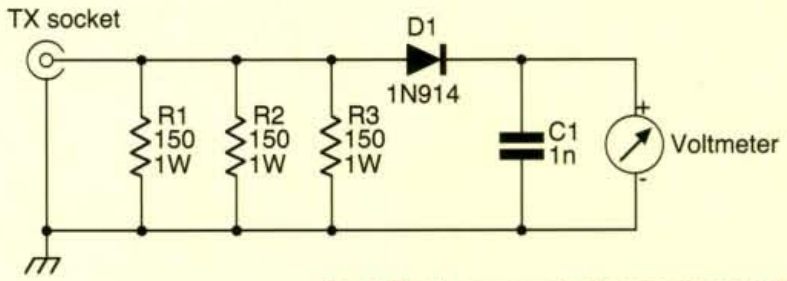


Fig. 1: Simple power reduction circuit (see text).

3. Power

The output power of the transmitter final stage **shall not exceed 3W p.e.p.** If the equipment in use is usually capable of a higher power, the power shall be reduced and measured by satisfactory means. The simplest way is often to apply a (variable) negative voltage to the transmitter a.l.c. line, reached via the accessory socket.

The output power can be accurately measured using the simple circuit of **Fig. 1**. Connect this to the 50Ω output of the transmitter and adjust the power so that the voltmeter does not exceed 16.7V on a good whistle into the microphone.

4. Scoring

Each contact will score one point, the total number of points gained in the seven hour period will then be multiplied by the number of different locator squares in which contacts were made. (A "square" here is the area defined by the first four characters of a universal locator).

For example: 52 stations worked in IO81, IO90, IO91, IO92 and JO01 squares; final score = 5 × 52 = 260.

Only one contact with a given station will count as a scoring contact, even if it has changed its location, e.g. gone /M or /P. If a duplicate contact is inadvertently made, it must still be recorded in the log and clearly marked as a duplicate.

5. Log

Logs may be submitted by E-mail or by post. In either case the log must consist of columns showing:

(i) time GMT;
(ii) callsign of station worked;
(iii) report and serial number sent;
(iv) report and serial number received;
(v) locator received (or location).

A log sent by post must be clearly written on **one side only** of A4 sized paper (210 mm width × 297 mm height), ruled into the columns listed above. Underline or highlight the first contact in each of the locator squares worked. At the top of each sheet, write:

(a) callsign of your station;
(b) your locator as sent;
(c) sheet number and total number of sheets (e.g. "sheet no. 3 of 5").

The sample shown below (**Fig. 2**) illustrates how each sheet should be headed. Log sheets and covering

Fig.2 : Sample log sheet for *PW* 144MHz QRP Contest (see text).

Practical Wireless 144MHz QRP Contest 2002

Date	Callsign	Locator	Sheet No Of

Time UTC	Callsign	Report & Serial No		Locator
		Sent	Received	

Contest Rules (continued)

information sheets which may be used for paper-based entries are available for downloading from the contest Web site.

A log sent by E-mail may be a file generated by logging software, provided it contains all the information listed above, or a file in any other suitable format (plain text is fine) which, if printed, would be equivalent to a paper-based entry.

Preferably, give the file a name including the station callsign (e.g. g4hlx.log) and send as a standard E-mail attachment - all common encodings can be accepted. If there's any problem with your entry you will be contacted by E-mail.

6. Entries

In addition to the log, the following information must accompany each entry:

(a) name of entrant (or of club, etc. in a group entry) as it is to appear in the results table and on the certificate;

(b) callsign used during contest (including any suffix);

(c) name and address for correspondence;

(d) details of location of station during contest. For portable stations, a national grid reference is preferred;

(e) locator as sent;

(f) whether single-operator, or multi-operator (a single-operator is an individual who received no assistance from any person in operating the station, which is either his/her permanent home station or a portable station established solely by him/her). If multi-operator, include a list of operators' names and callsigns;

(g) total number of contacts and locator squares worked;

(h) list of the locator squares worked;

(i) a full description of the equipment used including transmitter p.e.p. output power;

(j) if the transmitting equipment is capable of more than 3W p.e.p. output, a description of the methods used (i) to reduce and (ii) to measure the output power;

(k) antenna used and approximate station height a.s.l.

For an entry sent by post, this information must be written on a separate sheet of A4 sized paper. For an E-mail entry it should be written in the message sent with the log or, preferably, using the online form provided on the contest Web site, which also provides more information about sending entries by E-mail.

Failure to supply the required information may lead to loss of points or disqualification. The following declaration must then be written and signed by the entrant (by one responsible person in the case of a group entry), or included in the E-mail text: "I confirm that the station was operated within the rules and spirit of the event and that the information provided is correct".

Entries by post should be sent, with the log sheets, to: ***Practical Wireless* Contest, c/o Dr. N.P. Taylor G4HLX, 46 Hunters Field, Stanford in the Vale, Faringdon, Oxfordshire. SN7 8LX**, or by E-mail to: **g4hlx@breathemail.net** Entries must be postmarked or sent by E-mail **no later than 3rd July 2000**. Late entries will incur a heavy point penalty or may be disallowed.

Any other general comments about the station, the contest and conditions during it are welcome, but should be written on a separate sheet of paper.

Photographs of the station are also invited (but please note that these cannot be returned). If these aren't available by the time the entry is submitted they may be sent later, to arrive by 7th August 2000.

A summary of the results will be published later this year in *Practical Wireless* and the full detailed results list will be available on the contest Web site soon after publication in *PW*. If you would like to receive this list by post, please enclose an s.a.e. when sending in your entry.

A certificate will be sent to every entrant who encloses the corner flash from page 29 with their entry. If you're sending your entry by E-mail, to claim your certificate you **must** post the coupon to the contest entry address with a note giving the callsign of your station in the contest. Please make sure that we have the address to which the certificate should be posted.

7. Miscellaneous

When operating portable, obtain permission from the owner of the land before using a site. Always leave the site clean and tidy, removing all litter. Observe the Country Code.

Take reasonable precautions to avoid choosing a site which another group is also planning to use. It's wise to have an alternative site available in case this problem does arise.

Make sure your transmitter is properly adjusted and isn't radiating a broad or poor-quality signal, e.g. by over-driving or excessive speech compression. On the other hand, be aware that your receiver may experience problems due to the numerous very strong signals it will have to handle and that this may lead you to believe that another station is radiating a poor signal.

Before reaching the above conclusion, try heavy attenuation at the receiver input. The use of a high-gain r.f. pre-amplifier is likely to worsen strong-signal problems, so if you do use one, it's best to be able to switch it off when necessary.

8. Adjudication

Points will be deducted for errors in the information sent or received as shown by the logs. Unmarked duplicate contacts will carry a heavy points penalty. Failure to supply the complete information required by rule 6 may also lead to deduction of points.

A breach of these rules may lead to disqualification. In the case of any dispute, the decision of the adjudicator will be final.

The 19th Annual *PW* 144MHz QRP Contest
0900-1600UTC, Sunday 16 June 2002

Entries by post should be sent, with the log sheets, to: ***Practical Wireless* Contest, c/o Dr. N.P. Taylor G4HLX, 46 Hunters Field, Stanford in the Vale, Faringdon, Oxon. SN7 8LX**, or by E-mail to: **g4hlx@breathemail.net**

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- DTMF tones and autodial memories
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- Three scan modes
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- Wide and narrow FM TX/RX
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Stripboard Stress

David Clark likes using stripboard for his projects. He looks at two problems that can get in the way of a successful project built on stripboard and how to get round them, or better still, prevent them!

Although of limited use for radio frequency (r.f.) circuits, stripboard is a boon for the construction of relatively straightforward circuits operating at lower frequencies. This range includes power supplies and audio stages associated with a radio construction project.

Stripboard's main advantage is convenience. The convenience of not having to design and make a printed circuit board (p.c.b.). There's no expensive chemicals, tools and containers, and last but not least, there are no holes to drill for component leads.

However, despite its apparent simplicity and straightforwardness in use there are some, unique to stripboard, potential pitfalls for the unwary. There are two problems in particular that can occur that can take up a great deal of time fault finding if a project fails to work. This is often despite the circuit, components and wiring having being checked over and over again and being found to be perfectly correct.

Stripboard, unlike a p.c.b. has all the copper tracks already in position and, as all the holes are pre–drilled, they're not an issue. So, unless the circuit consists of very few components...at least one of the tracks will need to be cut at some point.

Track Cutting

The usual method of track cutting is to use the spot face cutter tool (without one of these you're making life difficult for yourself!). At this stage, the first type of problem can arise, fortunately a slightly cheaper alternative, a sharp 6mm drill can be (carefully) used instead.

Three holes are shown in **Fig. 1**, one good and two with problems. The right hand cut is incomplete, and would allow unwanted connections along the same track. This often happens if you use a drill bit which is slightly off-centre.

The left hand cutting has a burr that may connect to the adjacent track, causing other unwanted connections. This problem often occurs after the initial sharpness of the cutter has been lost, when the cutter doesn't cut completely through the copper, breaking it instead. (This can also happen if the tool is not held properly at a right–angle to the surface of the board).

Small copper slivers and links are often so small that they aren't obvious without the aid of a magnifier; they almost certainly won't be spotted by a cursory examination. What's more the sliver can be so thin that it appears as a resistance rather than as a short–circuit, so fault finding can become even more confusing.

Fig. 1: Three examples of track breaks, only the middle one is correct, See text for details.

Fig. 2: Bending components legs is one way of securing them before soldering, but not without problems.

Fig. 3: The solder holds close to the edge of the track and could cause a solder bridge if another component is fitted in an adjacent hole.

Mind The Gap

The second problem is to ensure that the gaps between tracks are maintained during soldering. This is because during the soldering process, the relatively narrow gap separating the tracks can be easily bridged with a blob of solder, even when the proper soldering technique is followed.

It's best to solder components to

Fig. 4: A fine solder bridge (or hair) is shown here. This could cause the circuit to fail catastrophically.

the board with the component legs passing straight through without bending, but this causes difficulties holding the components in place and soldering them at the same time. The most effective solution, holding the component in place with a 'spare' finger end, is just too painful to do more than once or twice! (*A suitable jig, by* ***Peter Macbeath,*** *appeared in Tex's Tips & Topics in the April 2001 issue of* PW. **Editor**)

Even using a specialised pad, problems can occur, due to the differing sizes of components. This may be partially overcome by soldering the components, in order of their relative height, the shortest being fixed first. Nevertheless a component can often slip part way through the stripboard during soldering. Apart from looking inelegant, a misplaced component can also contribute to bad connections should the slip occur just as the solder solidifies.

Effective Compromise

An effective compromise to hold components in place, entails bending the component leads in order to retain them when the board is turned over for soldering, **Fig. 2**. There is a particular problem that can arise when using this technique. And it's one that occurs more often when using stripboard rather than an specially made circuit board.

The problem arises due to the closeness of the tracks on stripboard, linked to the fact that most of the components fitted to the stripboard lie at a 90° angle to the direction of the track. When solder is applied to the 'bent over' leads the solder tends to gather towards the edges of the track - this effect is shown in the photograph of **Fig. 3**.

And so, if there are two soldered joints directly opposite each other on adjacent tracks, **Fig. 4**, a small bridge of solder can sometimes form between the two. This effect highlights how easily the fault can be hidden from view during a superficial inspection.

Solder bridging is less of a problem for p.c.b. based circuits since a p.c.b. layout can be designed so that tracks running parallel to each other can be routed further apart where a component needs to be soldered into position (other than for devices such as integrated circuits for example).

One, or both problems described above, might well be the cause of a non–functioning circuit if the wiring and components are in their correct places. A good way of tracking down and curing these copper and solder bridges simply involves using a modelling, or craft type knife at the right time.

Knife Blade

To track down poor track breaks, make all the track cuts as described, then, using the tip of the knife blade, carefully 'scratch' around the area of each cut. Small slivers of loosely held copper track should then easily come away. Now with a small paint brush (preferably an unused one!) remove any loose bits of copper from the surface of the board. As a final check have a look at each track cut with a magnifying glass if you have one.

To spot the solder bridges with the knife blade, carefully run the modelling knife blade between each track, **Fig. 5**. It's possible to 'feel' a small extra resistance to the movement of the knife where there is some unwanted solder.

Should the problem be a very small 'hair' of solder, the passage of the blade might be enough to get rid of the problem. The other option is re–soldering the joint, removing as much as possible of the old solder first, **Fig. 6**.

Again check for any bridges and get rid of any debris with a brush. Make a final check of the whole stripboard layout with a magnifier if possible.

Prevention

Prevention of solder bridges, is of course better than being able to cure them. Instead of placing component ends immediately beside one another, try to stagger soldered joints, as shown in **Fig. 7**. especially if you're the person designing the stripboard layout, stagger solder joint where possible.

Use proper soldering technique to prevent 'blobby' or 'dry' joints: keep everything clean and remove all traces of contamination from leads and copper track, especially if you have had them for some time, and clean and tin the soldering iron tip before making each joint.

Avoid using excessive amounts of solder and make sure that any rosin flux that can be seen between tracks has been investigated for solder bridges as in Fig. 7.

And of course, despite the temptation to do otherwise, check everything carefully before switching on for the first time - a circuit with a fault plus a component damaged by the initial fault will be much more difficult to fault find.

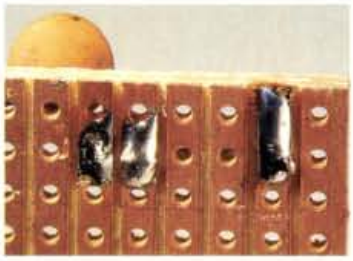
Fault Prevention

Some fault prevention measures of course apply as much to p.c.b. based circuits as to stripboard circuits. Always ensure that the components are of the correct value, are in the right place, and are connected the right way round where appropriate.

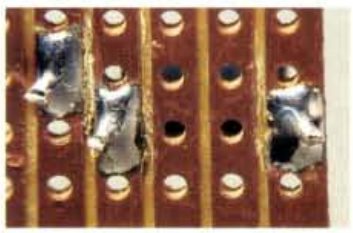
Taking all these points into account should mean that very little time and energy need be wasted on fault finding. Frustration can be avoided and more time can be spent enjoying using the device you've built. Unless of course you enjoy the challenge of fault finding, but that's another matter!

PW

- Fig. 5: Running a strong knife blade between the tracks could detect, or even cure solder bridges. See text for details.



- Fig. 6: An alternative is to clean and completely resolder the two joints, using minimal amounts of solder.



- Fig. 7: After running the knife between tracks to check for bridges. Don't forget to investigate any blobs of flux, they look ugly and can hide solder bridges too.

SUMMARY OF TECHNIQUES

- **Use a sharp spot face cutter**
- Hold the spot face cutter at a ninety–degree angle to the stripboard
- Centre the spot face cutter on the hole where the cut is to be made
- Clean up and check each track cut as soon as the cut is made
- Brush away any loose debris
- Support components to be soldered where possible
- Keep any angle of lead bending small
- Use good soldering technique
- Check for and remove any solder bridges
- Check for correct component values and placement
- Finally - check everything again!

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The 5/8th over 5/8th and Bridge you supplied did great - Using at FT817 at 2.5W (I bought this from you en route to somewhere else earlier this year!) into this simple array worked around 20 Europeans from what was a desert valley surrounded by mountains to 6500 ft, some 30Kms south of Windhoek all via FAI I believe. Thanks for the coffee and great service (again)

Laurence Howell G4DMA in absentia...

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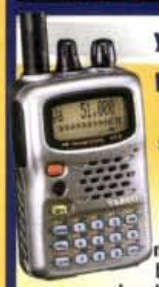

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Two Old Squares - as they describe themselves - Colwyn Low VK5UE and Steve Mahony VK5AIM having participated in quite a number of field days over the past years...decided that their points score could be bettered. So, you can now read all about 'square dancing' VK fashion!

square dancing

Australian Amateur Radio Style!

The study of magazine articles on v.h.f./u.h.f. contesting revealed that contacts between Locator Squares was the way to gain more points. In most contests the multiplication factor was quite high on the u.h.f. and microwave Bands...as high as 10 for some!

Our Locator number was PF95. And a check with the (Australian) Automobile Association maps and a Locator chart revealed some interesting facts.

The nearest four squares (after all the easiest way was to QSO from one square, i.e. PF95 to another) were the three adjacent squares, PF94, PF93, PF96.

A study of the map showed that squares PF85, 84, 94, met in the middle of the Gulf of Saint Vincent, just above Kangaroo Island! I can just imagine two small boats bobbing about trying to point 144MHz Yagis at one and other! How would you mark your position? That location was out...!

The other locations, in the QF Locator 05, 04, were out in the Murray Lands, between the river and the South Australia and Victoria borders. How many Locals (Adelaide stations) would you work from out there? Very few I'd say!

● A great deal of effort from VK5UE and VK5AIM was necessary before these 50, 144 and 430MHz antennas were ready for business for an Australian Field Day.

Going North

Going north we found that the PF95, 96, 86, 85 squares all met at a point just north of the small town of Kulpara, some 100km north of Adelaide. This was just north of the Gulf of Saint Vincent, and a favourite spot for microwave QSOs. Additionally, the Lochiel repeater **VK5RLH** is only 10km from the meeting point.

So, Colwyn and I decided a reconnaissance of the location was required. As we're both retired, a week day was a good time to carry out our checks. We took along a small portable 144MHz beam, the dual band transceiver in the vehicle and a dual-band hand-held.

After about an hour's drive we reached our destination. A further, shorter drive, took us along a dirt road between crops to a high point overlooking the Gulf itself.

We could just make out the Mount Lofty ranges overlooking Adelaide through the haze. A check on 144 and 430MHz with the vehicle rig proved we could access all the Adelaide and metropolitan repeaters. It was a good sign, we should be able to work all the participating metropolitan stations on simplex.

Finding Magic Corner

After a short discussion we decided to find the 'magic' corner of the four adjacent locator squares. Previous studies showed that several dirt roads traversed the area.

Colwyn VK5UE navigated and studied the map, and I (Steve VK5AIM) drove and read out the odometer distances. We set out, heading north west.

After about five kilometres Colwyn called for a stop. He hopped out and marked a tree with yellow paint with an aerosol pack. "Graffiti Vandal" I shouted, only to be laughed at!

Continuing on we reached another dirt road heading north. I turned north and continued to read out the distance readings. After some five or six kilometres Colwyn again called a stop, hopped out and again 'graffitised' another tree with a bold yellow X...here was the latitude line.

We continued along till we reached another dirt road running East/West. Then we turned and headed east, again counting off the kilometres until after another five or six kilometres Colwyn called a stop and marked yet another tree. We had now located all the other three locator squares.

Next, we continued on until we reached the main bitumen road, turned around and retraced our path. (This was to cross-check the odometer's accuracy).

It was on this return trip that we met one of the local farmers - complete with sheep dog. He wanted to know "what we two silly old beggars were up to"? A short explanation comparing v.h.f./u.h.f. Amateur Radio with u.h.f. CB, Yagi antennas and repeaters followed and all was understood. (In VK farmers are great users of u.h.f. CB. Once away from the big cities there are

no 'Ratbags' on the channels and it can be used as intended).

Highest Locations

Our X-marked gumtrees were no more than 10m out, so we decided to try the best and highest locations. Two of them were satisfactory and we could trigger VK5RAD from the vehicle with the 5λ/8 whip.

The third location, which fell away to the north west, was poor and we had to resort to the portable beam. It was while at this location that we were able to trigger the Cowel repeater over on the Eyre Peninsular...about 150km to the west.

Things were looking good! We returned to our nominated base location, but not before meeting another farmer curious to find out about our antics. A similar explanation and all was well!

On reaching our base location we had some lunch and decided that it was no time like the present to see if we could work all the other three chosen locations on 144MHz. I left Colwyn with the hand-held on a simplex frequency with instructions to go to the local repeater VK5RLH on the nearby Bumbunga Hill if he lost me.

I then set off for the first selected spot just on from the 'Graffitised" Gumtree. I called and back came Colwyn saying "You are five and nine" with my reply also giving him five and nine. "Good I thought....I'll move on to the next location". (This was the one to the North-West on the falling away ground).

As expected Colwyn was barely readable. We confirmed this via the repeater and I said I'd erect the portable beam. This I did and signals were much better, but not as good as the other location.

We agreed that with more power and a bigger beam at the base, signals would be a lot better. So, I then dismantled the portable beam and proceeded to the third location. Signals were five and nine both ways from whip to hand held so we had no worries.

I proceeded to return to base, this is where I got lost on the wrong dirt road! I had to call for help on the repeater from Colwyn...only to be told by Colwyn: "I can see you from here, turn around, go back to the bitumen and come back up two dirt roads further on". A good job we had radio contact otherwise I could have wandered around and Colwyn would have had a long walk home!

Home To Elizabeth

The trip home to Elizabeth Downs (our home base in South Australia) was uneventful. On the journey we discussed the site for the coming Spring and Summer v.h.f./u.h.f. contest.

I'd obtained several 150mm fibreglass poles that had been the outer case for mobile phone/pager coaxial dipoles. Once the copper and brass elements had been removed for salvage/scrap, no one wanted the outers.

● Colwyn VK5UE during the Spring Filed Day in 1999, operating from one of the squares (see text). The VW Beetle's rear off-side wheel is standing on the mounting plate of Steve's 'Chinese Copy' of the *PW* 'Tenna-Tourer' portable mast base. Neat eh?

At 3m long, with two joined with an aluminium sleeve they made a 6m (20ft) lightweight mast. With a specially made tilting base plate, two sets of nylon guy ropes with slipping support plates, we had an easily transported and erected antenna support.

A short extension with cross arm carried the 144 and 430MHz vertical beams. Our 3-element 50MHz beam was mounted horizontally below.

● Steve VK5AIM and Colwyn VK5UE (behind camera!) operating in the Australian 'Spring Field Day' in 1999. The neat looking portable mast system is very professional looking isn't it?

Colwyn insisted that some identification was placed on the antennas to indicate the front-end. This was because on a previous contest he had complained about signal strengths only to be told he had the beam pointing the wrong way!

We even attached labels to the coaxial cables so that the correct antenna was attached to the appropriate transceiver. Very frustrating to hear weak signals and have a high v.s.w.r., only to find you are transmitting into the wrong antenna!

Bad News

Some days later Colwyn called me on 144MHz to say he had some bad news! He'd decided that we needed to know the location of the boundaries of the four locator squares with greater accuracy and purchased one of the topographical/survey maps.

You would never believe it! The survey maps actually used the latitude and longitude boundaries of the four locator squares, those we required, as the edges of their maps!

Colwyn had to buy four maps at $A7.50 each. He proceeded to photocopy the respective corners, cut and paste them and copy them again, to give us a map of the required area. A total of $A30 for a small section of the district!

Then came the surprise...the Australian AA map was about 2km out with its Western longitude (Just our luck!). A study of the map showed another dirt road some three two four kilometres to the West, and it also ran from North to South.

It was decided that another trip to check it out was not necessary and it should not make much difference to the signal path.

We carted all this along with batteries, generators, food and sleeping gear up to the chosen site on the day of the field day, but that's another story which I'll be pleased to share some other time. But perhaps you'll realise that - as you prepare for the *PW* 144MHz QRP Contest...that finding a suitable site (**and knowing exactly where you are**) is much simpler in Europe than it is in Australia!

PW

Carrying On The Practical Way

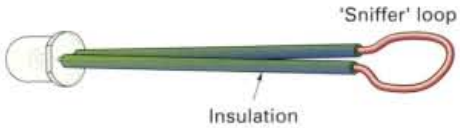
This month the Rev. George Dobbs G3RJV has a few more radio frequency diode projects and bright ideas for using light emitting diodes. However, you can't start building until you've read the special quotation!

"Most people would succeed in small things if they were not troubled with great ambitions".

Henry Wadsworth Longfellow, *(Driftwood; Table Talk, 1857)*

One of the delights of Amateur Radio construction can be 'doodling with components': looking at little circuit ideas and trying them out. (Try it for yourself). A few simple circuits from magazines and books, a few basic stock parts, and a hot soldering iron is a good way to pass a cold or wet evening and to learn a little more about the technical side of the hobby.

In last month's column I looked at some ideas for detecting radio frequency (r.f.) signals using diodes and light emitting diodes (l.e.d.s). So, when I was trying out the practical ideas for that column, I continued to explore those ideas with a few more little projects along the same theme.



● Fig. 1: A 'loop' detector device using a light emitting diode. Simple but effective!

Mizuho Kit

Several years ago, I obtained a kit for a 7MHz transmitter made by the Japanese Mizuho Company. (They still make them although we rarely see them here in the UK). And on a visit to Japan a couple of years ago I had the pleasuring of visiting Mizuho as the guest of the delightful **Mr. Takada**, the founder and owner of the company.

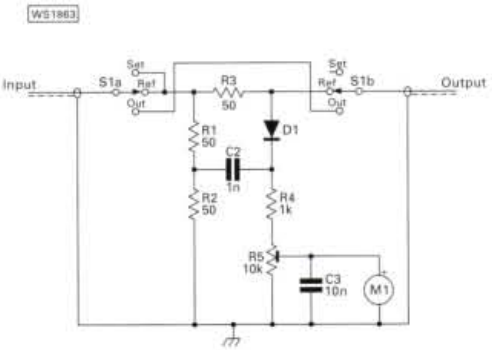
The Mizuho transmitter kit had a very simple idea for measuring the r.f. output. However, 'Measuring' is perhaps too grand a word for it, as it really only shows that a radio frequency signal is leaving the transmitter.

The circuit is shown in **Fig. 1** and it's a single l.e.d. with a detector loop on the end. The idea is to solder a small hairpin loop on the end of an l.e.d. with some insulated sleeving on the component's lead-out 'legs'. Next, the hairpin is then bent into a larger loop and the sleeving pushed back over the solder joints.

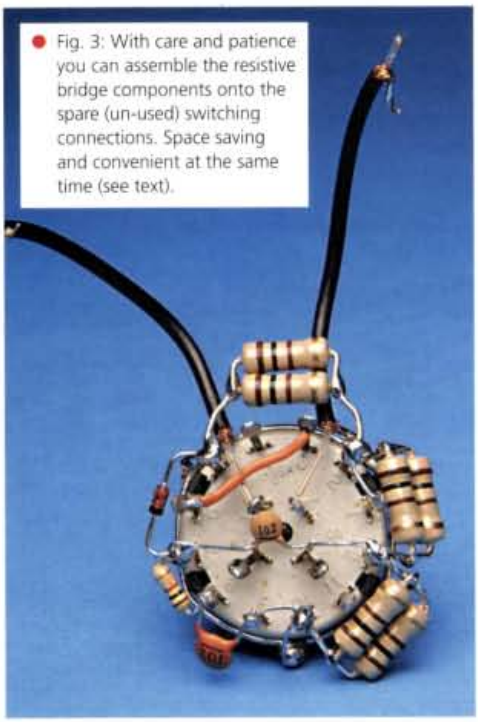
In the original circuit the loop was placed over one of the low pass filter coils on the output of the Mizuho transmitter. If toroidal cores are used for the low pass filter inductors, the single loop can pass through the core of inductor. Not much of a circuit perhaps...but it works and it's reassuring to see the l.e.d. glow as the transmitter is keyed.

Bridge Circuits

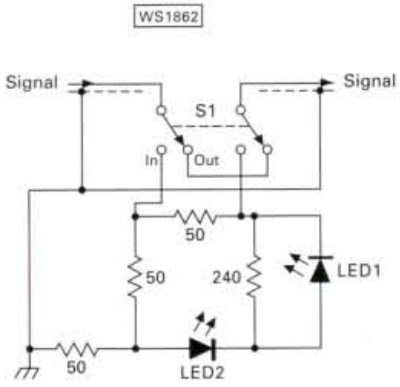
In recent years, several voltage standing wave ratio (v.s.w.r.) bridge circuits using l.e.d.s. as the indicator have appeared in Amateur Radio sources. The usual form of v.s.w.r. bridge used in these circuits is the resistive form and **Fig. 2** shows the



● Fig. 2: Circuit for a resistive type v.s.w.r. bridge (see text).



● Fig. 3: With care and patience you can assemble the resistive bridge components onto the spare (un-used) switching connections. Space saving and convenient at the same time (see text).



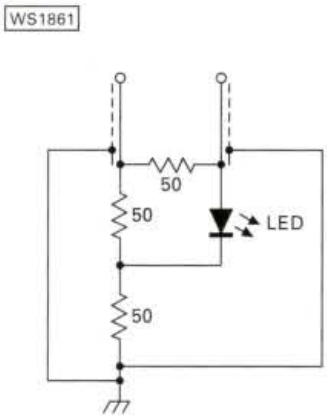
● Fig. 4: A resistive type v.s.w.r. bridge using two l.e.d.s as indicator (see text).

usual arrangement for this type.

Based on the Wheatstone Bridge, so beloved of physics masters in my school days the circuit uses 50Ω resistors forming three sides of the bridge, the fourth side being the antenna or antenna tuning unit (a.t.u.). As with the d.c. Wheatstone Bridge, when the resistance of the four legs is equal, the meter across the bridge provide a null reading.

The circuit uses a diode (D1) as the detector and a sensitivity control (R5) for the meter. A germanium diode is ideal for D1, although I have often used silicon diodes in this circuit. Almost anything will do the job.

The 50Ω resistors need to be capable of handling the power of the transmitter. For QRP signals this is not much of a problem and lower power rated resistors connected in parallel to give 50Ω.



● Fig. 6: Circuit of a simple l.e.d. v.s.w.r. indicator which G3RJV considers to be the simplest possible (see text).

In my version, shown in **Fig. 3** I used two, 1W, 100Ω resistors to give a 2W power rating. In fact I've used these values with transmitters with up to 5W of r.f. output. The resistors **do become warm** but if the v.s.w.r. checking time is short, the warming is acceptable.

One of the disadvantages of the resistive type of bridge is that it needs switching out of the r.f. signal path when the transmitter is being used. This requires the use of a 2-pole, 3-way switch.

In the **Set** position, the signal appears across R1 and R2, **without the antenna in the circuit**. This enable the meter to be adjusted to full scale deflection (f.s.d.) using R5. In the **Ref** (reflected) position, the bridge is switched into the r.f. signal path for measurement and the antenna or a.t.u. may be adjusted for minimum reflected signal. The **Out** position shorts out the bridge and allows normal operation of the transmitter.

The G3RJV Favourite

The switch mounted version shown is, my favourite way of implementing the circuit in **Fig. 2**. The whole circuit can be wired, point-to-point style, on the back of a 4-pole, 3-way wafer switch.

Looking at the photo, the top two segments of the switch perform the switching action. The bottom two sections are not required for the switching of the circuit so the switch terminal can be used as anchor points for other components. These two sections switch to nothing so the outer tags can be treated as insulated terminal points.

It's just possible to mount all the required parts on the switch as shown. Many wafer switches are of plastic construction, so I put a loop of copper wire around the outer edge of the switch to allow short connections to ground for the input, output and bridge.

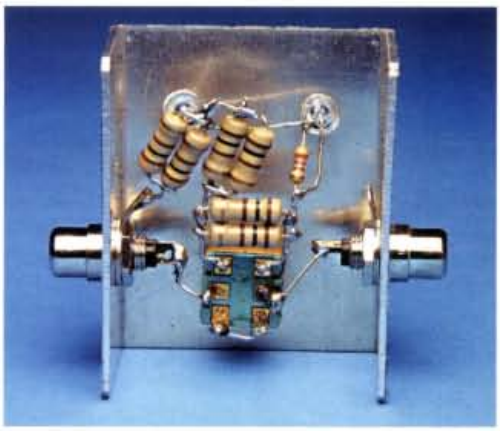
The layout allows for a compact v.s.w.r. bridge which can be mounted in any situation where the 3-pole, 4-way switch will fit. I've actually used this layout in many little transmitters and transceivers for about 20 years.

It has normally been used in conjunction with surplus tape recorder meters or CB type S-meters which usually have a full scale deflection in the order of some 200μA. My meters have been picked up on electronics surplus stalls at Amateur Radio events (buying a suitable meter for this project at full price could be quite expensive).

An alternative idea is to use an Ultra-Bright or Super-Bright (UB/SB) l.e.d.s. And, as I mentioned in the last edition of this column, these will glow at very low current levels.

● Fig. 7: The simpler indicating bridge of Fig. 6 built into a small recovered metal box.

The diagram, **Fig. 4**, shows the simplest way to use a couple of UB/SB l.e.d.s in conjunction with a resistive v.s.w.r. bridge. In this case the switching has been simplified, and as no setting of a meter is needed, a double-pole change-over switch is all that's required.



● Fig. 5: The resistive indicating bridge of Fig. 4 built into a small aluminium box.

The bridge is switched to be in or out of the r.f. path. My version uses two 5mm ultra-bright l.e.d.s (4500mcd* – part OPT174) obtained from **Bowood Electronic**s. I even built the circuit into a little box with terminals and a switch as shown in **Fig. 5**.

See explanation of terminology in last month's column* **Editor.

Operation Simple

The operation is simple, just switch the bridge into the transmission path and adjust the a.t.u. If the v.s.w.r. is poor both l.e.d.s will glow. As the v.s.w.r. becomes lower with adjustments, l.e.d. 1 will dim until it extinguishes, and l.e.d. 2 will increase in brightness, and at the null point, it will suddenly extinguish. This provides a coarse and fine adjustment indication of v.s.w.r..

The simplest possible l.e.d. indicator v.s.w.r. instrument is shown in **Fig. 6**. This particular circuit originated with **Diz W8DIZ**, of the Flying Pigs QRP Group and has appeared in several projects.

The 'top' of the circuit corresponds to the bottom of the switch in Fig. 3. The circuit is what's switched in to measure the reflected signal. in use, the a.t.u. is adjusted until the l.e.d. goes out and that's all there is to it!

I used an 8mm ultra-bright LED (1600mcd – part OPT176) again from Bowood Electronics, see **Fig. 7**. The circuit is very compact and could be ideal for portable use, or perhaps built into a small tuner at the bottom of a mobile whip antenna. Try it out for yourself...it's simple and fun!

PW

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A Simple Inductance Meter

James Brett G0TFP looks to his shelf full of test gear and suggests you can add to your own collection. Here he presents his simple, but effective, impedance-measuring inductance meter.

The operation of this inductance meter relies on very simple theory. That simple theory is: that the reactance of an inductor is proportional to frequency (2pfL) and that when an a.c. current is applied to an inductor, then, by Ohm's law, the voltage across the inductor is proportional to the current $V=I/(2\pi fL)$.

So, if the current and frequency are both kept constant, then the voltage across the inductor will be directly proportional to the inductance itself. The design presented here, utilises a sinewave oscillator to provide the a.c. drive, feeding a transistor that converts the sinewave to a constant a.c. current.

To measure the voltage generated by the current in the inductor, and thus the inductance value, operational amplifiers (op-amps) are used with switched gain. The output of the final op-amp is fed into a rectifier, then to a moving coil meter that indicates the a.c. voltage across the inductor. So, let's look at the circuitry

Oscillator Circuit

I'll start with the oscillator circuit, which is a standard Wien Bridge, it's the left hand part of the full circuit shown in **Fig. 1**. The principle of operation of this circuit is the same as any oscillator - positive feedback is applied to an amplifier. In this case the selected frequency feedback is applied to the non-inverting input of an op-amp.

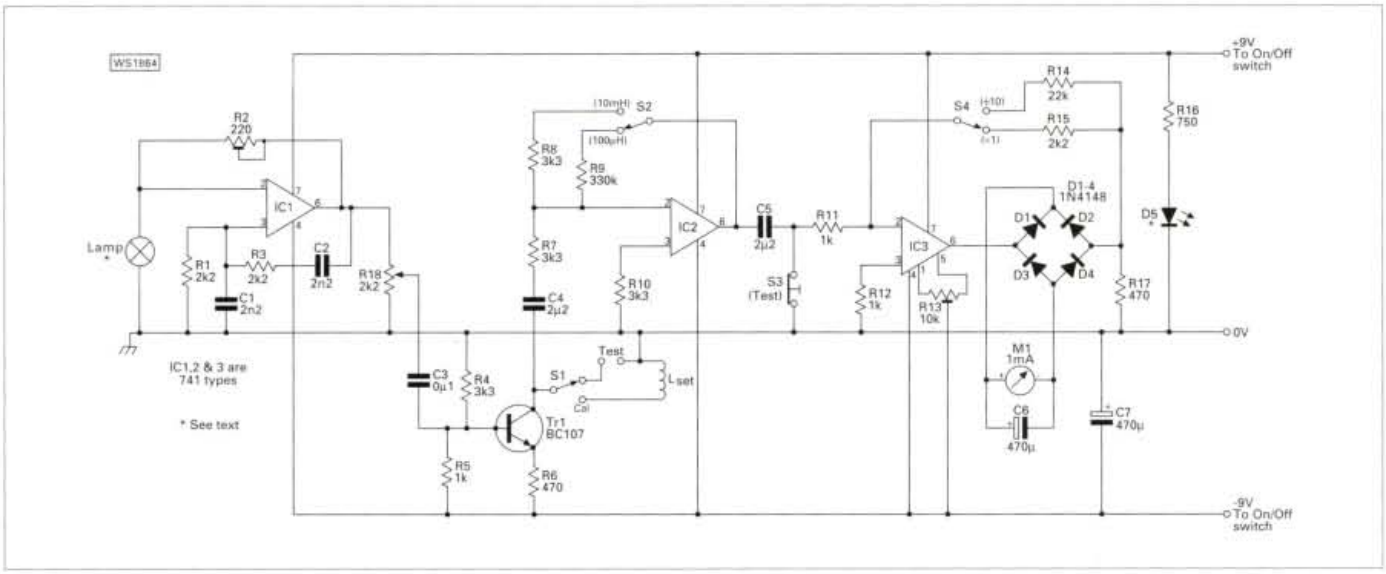
The resistor/capacitor network consisting of R1, R3, C1 and C2 in the feedback loop gives zero phase shift feedback at a frequency given by the calculation: $f=1/(2\pi RC)$. With the values used the oscillator runs at approximately 3.3kHz. To ensure a pure sinewave (necessary to prevent the current through the inductor causing 'ringing') the overall gain of the amplifier loop has to be kept at unity, the function of R2 and the lamp.

The resistor and capacitor network has an attenuation factor of three and so the op-amp has to provide a gain of three to compensate. The negative feedback circuit R2 and the lamp on the inverting input of IC1 set the overall gain value just sufficient to maintain oscillation.

When R2 is adjusted correctly, should there be any increase in the op-amp output a slightly higher voltage is developed across the lamp which causes the filament to become hotter. At this part of its 'under run' characteristic this increase in temperature causes a considerable rise in the filament resistance, causing a reduction in gain.

Higher Level

The increase in the lamp's resistance allows a higher level of negative feedback. This reduces the overall gain of the whole circuit so, tending to bring the output back towards the original level. The overall effect being to keep the output amplitude constant.



● Fig. 1: The circuit of the complete project.

The sinewave is applied to the base of Tr1 via the potentiometer R18. The emitter resistor of Tr1, R6, is not bypassed so the transistor behaves much as an emitter follower. The current flowing through the transistor thus follows the sinewave in a direct proportion (*although it's superimposed on a standing d.c.current. **Editor***).

Providing the voltage drop due to the load in Tr1 collector circuit is kept small compared to the supply voltage, the transistor behaves as a current source of an a.c. signal that may be passed through the calibration inductor or inductor on test. The a.c. component of the voltage developed across the inductor is fed by C4 to the first amplifier IC2. This is a conventional amplifier circuit with a switched gain of either one or 100.

Following the selectable gain stage of IC2, the signal is then fed to the second amplifier IC3 via C5. This stage also has a switched gain, but this time the gain is set to either two or 20 times. The output of this IC3 amplifier stage is fed via the bridge rectifier (formed from Diodes D1 to D4) to the meter M1, then to the resistor R17 from which the feedback is taken.

Because the applied feedback is taken across R17, the voltage across it represents the voltage across the inductor under test. The output of IC3, is sufficient to overcome the forward volt drop of the diode bridge so that the scale of meter M1 may be considered to be linear.

To compensate for possible offset voltages at the output of IC3, potentiometer R13 is adjusted to set the quiescent output on pin 6 of IC3 to around 0V. There's a safety feature, in that the switch S3 clamps the input of IC3 to 0V until you are ready to make a reading. This simply saves the meter needle being hammered against its stops when inductors are changed at the test terminals!

Construction

Now let me turn to the construction, and here I used a plastic project box roughly 170×120×75mm ... a convenient size for ease of drilling etc. (it can be plastic since with all low frequency sinewave operation there is no EMC problem). The heading photograph shows the finished project.

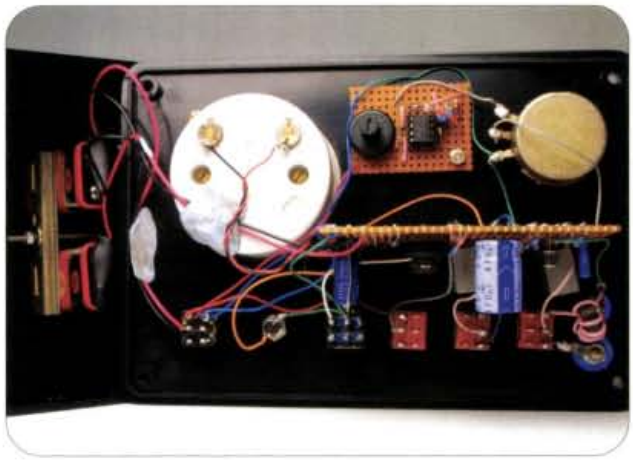
The circuit boards and other components are mounted on the lid with the exception of the two batteries which are clamped to the side of the box. You should be able to see the basic layout in the photograph, **Fig. 2**.

In general, care should be taken to keep all the leads as short as possible. On the strip boards all tracks should be cut at each end of the connection(s) being made to prevent errors due to stray signal pick-up.

I suggest starting with the small oscillator board, a photograph of my prototype is shown in **Fig. 3**. This layout works and should be generally followed, using the photograph as a guide. After carefully checking the circuit and board, the oscillator board is mounted flat against the lid near R18.

It might be an idea to test the oscillator at this stage. If an oscilloscope is available, then connect the probes to the output of IC1. A convenient test point is the across the variable resistor R18. If the oscillator is working then adjust R2 to give a 2V peak-to-peak signal and check that the waveform is sinusoidal.

Should an oscilloscope not be available, a multi-range meter capable of reading approximately 0.5V a.c. can be used to set R2. As an extra check a high resistance ear phone (1-2kΩ) can be connected across R2. Since the output is an audio signal at 3.3kHz, you should hear a rather high (but pure) note.



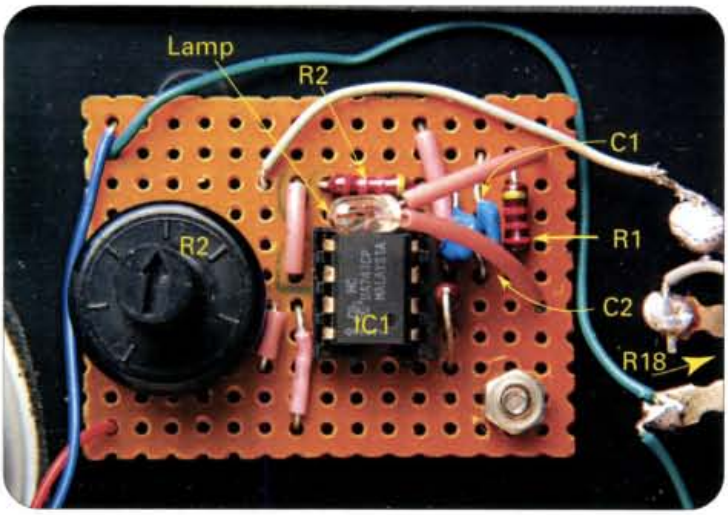
● Fig. 2: Looking inside at the boxed project. This lay-out may be used as a template for your own version.

Main board

The main board carries all the rest of the active circuitry and is rather complex, if you are new to using strip board. (*An excellent article describing the techniques of using strip board appears elsewhere in this issue. **Editor***).

I mounted the main board on an L-shaped bracket held rigidly in place by a nut and bolt. You may consider fixing the bracket to the the top panel using one, or more, of the switches.

You should make careful measurements when marking out the top panel, prior to placing the switches and remeasure before

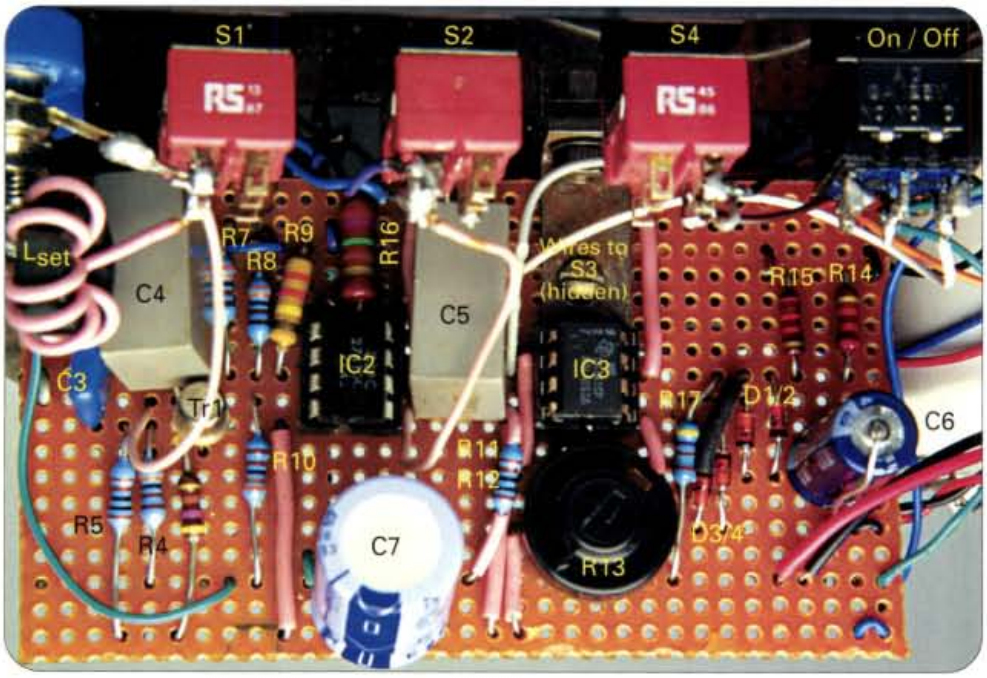


● Fig. 3: Overlay of the oscillator board.

making any holes. It's easy to get mixed up when looking at both sides of a panel.

Again using the annotated photograph of Fig. 4, make your own version of the main board. The layout isn't that critical at these frequencies. But as I mentioned for the oscillator board, the layout

overall accuracy should be chosen to give a reading as close to full scale as possible on the appropriate range. I've found that the ideal value to use is 100µH. It is mounted directly onto S1 and the common side test terminal. Don't worry you don't have to wind a toroidal inductor as is shown in Fig. 3, it's



● Fig. 4: Overlay of the main board and its relative placing on the top front panel of the box.

works so, it's an idea to follow it, even if only in general terms.

Considering Calibration

Although it might seem rather early to consider calibration. The meter may be calibrated before each reading as there is is a known value 'Test' inductor (L_{set}) fitted to the unit, it's selectable via S1.

The calibrating inductor can be any known value, but for the best

just that I decided to make my own and I had the facilities to do so.

After another careful wire check connect the batteries but do not close lid.

Set R13 about mid-travel, and with a voltmeter set on a low d.c. voltage range, check the output pin of IC3 against 0V. The voltage should be around 0V, but if not some adjustment is possible by setting R13 one way or the other.

You may find that the output

changes level quite quickly when it's set right. However, after adjusting R13 to give a zero reading on the meter, the box can then be closed as all further operations are carried out via the front panel

Into Operation

So, after you've built the project how do you put it into operation? In use, you set S1 to the **CAL** position, the range switches S2 and S4 to suit the calibrating inductor and R18 fully anticlockwise. Then switch on.

Operate the **Test** push button S3 and adjust the **SET** control, R18, to give a reading corresponding to the calibrating inductor value. As the various different ranges are all set by the feedback resistors through S2 and S4, the ranges are set as accurately as the resistor

feedback networks and the accuracy of the calibration inductor. So, one resistor for calibration is quite satisfactory. The meter is now set ready for use.

On future occasions when the unit is used it's only necessary to set R18 and the range switches to give the correct scale reading on the meter. It couldn't be easier, could it?

Happy measuring!

PW

SHOPPING LIST

Resistors

Fixed 0.5W (5% or better)		
470Ω	2	R6, R17
750Ω	1	R16
1kΩ	3	R5, R11, R12
2k2	3	R1, R3, R15
3k3	4	R4, R7, R8, R10
22kΩ	1	R14
330kΩ	1	R9
Variable (Chassis mounted linear)		
2k2	1	R18
Printed circuit mounting preset		
220Ω	1	R2
10kΩ	1	R13

Capacitors (All at least 18V working)

Close tolerance		
22nF	2	C1, C2
Polyester		
100nF	1	C3
2.2µF	2	C4, C5
Electrolytic 25V working		
470µF	2	C6, C7

Semiconductors

IN4148	4	D1, D2, D3, D4
741	3	IC1, IC2, IC3
BC107	1	Tr1
l.e.d.	1	D5

Switches

SPDT	3	S1, S2, S4,
DPST	1	S5
Pust-to-break	1	S3

Miscellaneous

1mA moving coil meter, 12V 25 to 60mA pea bulb lamp, strip board (32x17)holes and (15x11)holes, potentiometer knob, 2 x 9V PP3 batteries and battery snaps, plastic box approximately 170¥120¥75mm, miscellaneous brackets and screws.

Overlay plans

Copies of the author's original overlay plans are available from the editorial offices. Enclose an A5 sized stamped s.a.e. marked 'Inductance Meter'. Our address is on the Contents Pages.

Antenna Workshop

Where to Put It!

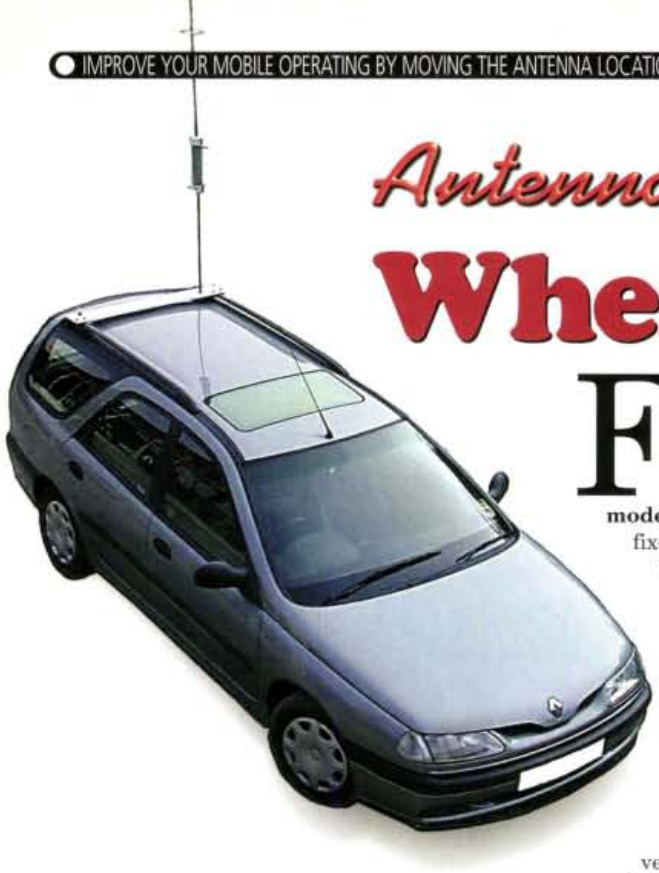


Fig. 1. The Texas Bugcatcher mounted on a special antenna rack, which in turn is fixed to the luggage rack, snapped while Peter visited the Amberley Industrial Museum, in the South Downs. Among the many attractions is a radio museum, featuring domestic, military, commercial and Amateur Radio equipment (website: www.amberleymuseum.co.uk)

Peter Dodd G3LDO tries to answer the awkward question of just where do you fix your h.f. mobile antenna for the best results?

For h.f. mobile operating the main question is just **where to put the antenna on a modern vehicle**. It can be fixed to the roof on a luggage rack or by using a hatchback or tail gate mount. Otherwise it can be mounted low down on the vehicle on a tow bar or a special bracket fixed to the underside of the vehicle.

In this article I'll be using computer modelling to try to answer the antenna mounting question. I will also try to ascertain if the size of the vehicle affects h.f. antenna performance and if there's an optimum antenna location for mobile working.

So, just where would be the best location be? As the antenna radiation and ground resistances are in series, E^2R losses are important and for best effect the radiation resistance should be as high as possible.

If I assume that a maximum safe height for a roof mounted mobile antenna is between 2.5m to 3m, then the available antenna length is reduced by the height of the vehicle. This results in a physically short antenna with a relatively low radiation resistance, although the point of maximum radiation is on the highest part of the vehicle.

I suggest the use of an antenna mounted low on the vehicle such as a tow bar. As then a longer antenna can be used that has a theoretical greater radiation resistance because radiation resistance of an antenna is proportional to its length.

Computer Modelling

I'm a great fan of computer modelling for antenna installations, using modelling software called *EZNEC3* for most of my antenna installations. So, it was to this aid that I turned when trying to answer the question of where to mount my mobile antenna.

Normally the software is used for modelling conventional antennas and their environment, but I've found that a wire grid can be used for simulating a solid conductive surface such as a metal vehicle body. My vehicle is a Renault Laguna estate, which is 3.8m long, 1.4m wide and 1.45m high, and is shown in **Fig. 1**.

A wire model of the vehicle was constructed and it's shown in **Fig. 2**. The model does not have the exact dimensions of my vehicle because the model was constructed from similar sized rectangles for simplicity.

The model was placed so that the base of the vehicle body was 150mm above the ground. The *EZNEC* manual states that the minimum height should be good down to at least 0.005l which, at 30MHz, is just about the dimensions chosen.

Antenna losses using can also be modelled and loading coils frequently have a significant amount of loss, (though it's best determining by measurement). An informed estimate is usually adequate if measurements are not available. Air-wound inductors typically have Q figure in the range of 200-400 or so, which gives the equivalent series loss resistance about $1/Q$ times the reactance.

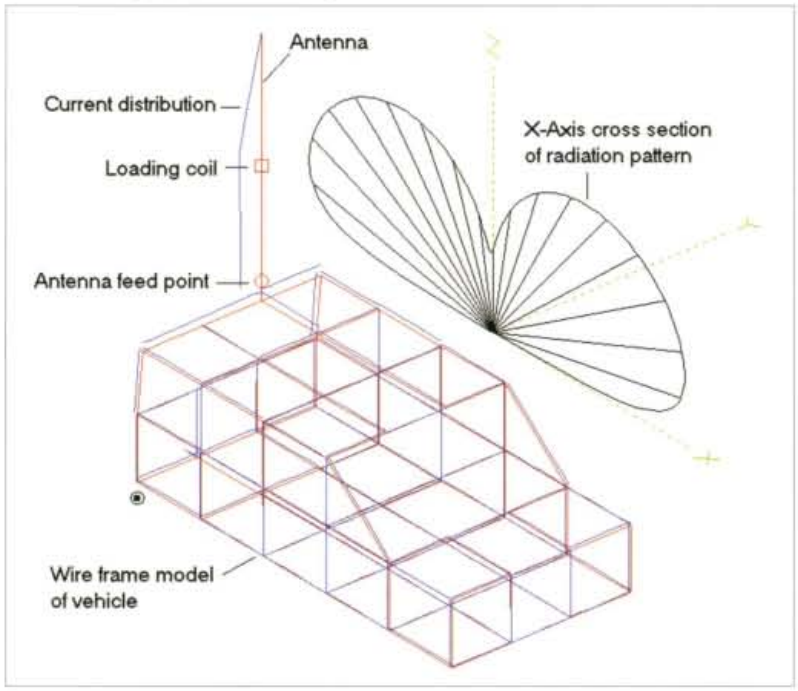


Fig. 2: Computer model of the estate vehicle and antenna shown in Fig. 1. The vehicle body is modelled using 112 'wires'. The distance between the vehicle lines (red) and its associated current (blue) line is an indication of relative current flow.

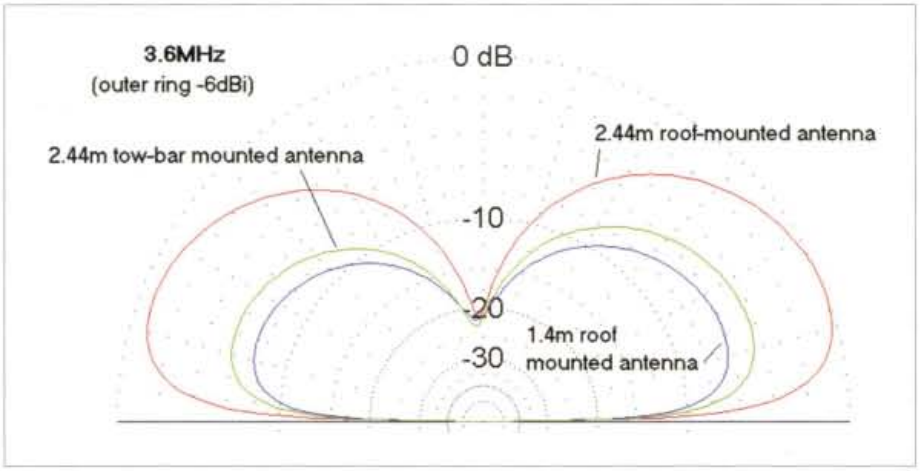
The Texas Bugcatcher antenna, which I selected as the test antenna, uses a fair high quality loading coil and so, I used a Q value of 400 for the model. The calculated feed impedance figures, compared well with measured values.

The vehicle I^2R losses were included by

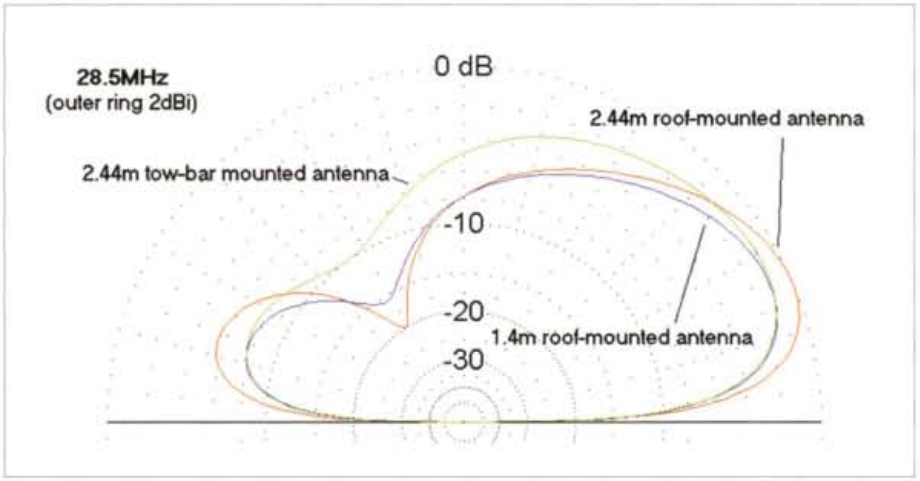
specifying Zinc (rather than copper) as a wire loss parameter. Usually there is a coating of such material on the metalwork of the vehicle to provide corrosion protection. Zinc was also specified for the antenna element because the Texas

which in turn was fixed to the existing luggage rack as shown in Fig. 1. A short wire link from the frame of the antenna rack direct to the car body ensured the antenna base was properly 'earthed'.

Measurements were also taken of the



● Fig. 3: When roof mounted the overall antenna length controls the maximum radiated field when used on the lower band of 3.5MHz. There is little directivity in this model, contrast this with Fig. 4.



● Fig. 4: On the higher bands the overall antenna length makes little signal difference, but a distinct directivity towards the front of the vehicle appears.

Bugcatcher, in common with many commercial mobile antennas, is made of stainless steel.

The model also indicates that there can be a fairly high currents flowing in the vehicle metalwork. It's known that some antenna configurations can interfere with the electronic engine management systems in some vehicles ... the models also show that the vehicle is part of the radiation system of a mobile antenna.

Measurement Verification.

Computer modelling is now in common use both by professionals and amateurs alike. However, I nevertheless felt that it would be useful to try and gain some verification by practical measurements of feed impedance and signal strength.

For roof mounted measurements the antenna was mounted on a special rack, same antenna mounted directly on the tow bar using a suitably constructed antenna base adapter. The antenna feed impedance was measured using a Hewlett-Packard HP4085A Vector Impedance meter. In both cases they turned out to be very close to the predicted values.

Field strength tests were made around 29MHz, chosen because with this frequency, a closer near field/far field boundary is given. As the measurement needs to be made at a positional height of at least 10° above the horizontal plane, then you can see the advantage of being closer in.

Using the model

The first question again is: **just where is the best place to mount the antenna**? There are three situations that I considered. The first is that of a traditional tow-bar mounted 2.44m centre-loaded whip. The second is with the same antenna is mounted on the roof.

A Texas Bugcatcher antenna, fixed to the roof of a car is not a realistic system for fast motorway driving so a third option has been considered; that of a half-sized antenna around 1.4m long, with increased inductive loading.

I have modelled the roof mounting positions at the rear of the vehicle, where the antenna would be positioned in the case of hatch mount or tailgate mounts. The results are shown in **Fig. 3**. (The images are viewed from the side of the vehicle with its front to the right).

The diagram of Fig. 3, shows comparisons between roof and tow-bar mounted antennas on the 3.5MHz band. The data shows very little difference between the short roof mounted antenna and the traditional longer tow-bar mounted antenna. The roof mounted antenna has a 5dBi advantage but is not very practical for driving, though it's fine for ' /M' operating when parked up.

I've shown comparisons between roof and tow-bar mounted antennas on the 28MHz band in **Fig. 4**. The short roof mounted antenna gives as much gain at low angles as the larger tow-bar mounted antenna, though the model predicts an increase in directivity as the frequency is increased.

Good Indication

The *EZNEC* model gives a good indication of the feed impedance, with both modelled and measured values in close agreement. The measurements of field strength also agree with the predicted values, within the limits of the measuring arrangements. It's these correlations that give confidence in the field strength distributions predicted by *EZNEC*.

The computer model of the installation explained why mobile operators had not found a generally accepted optimum location on the vehicle for an h.f. antenna. One surprise was the directional effects on the higher h.f. frequencies, could be used to advantage (when you are aware of them!).

These directional advantages has been successful for **Alan Birch G4NXG**,who has **worked over 327 countries while operating mobile**. Most of this operation was from a fixed site and Alan reports that his mobile station has an improved performance when being operated close to the sea.

Another operator, **Chris Page G4BUE** also mentions being aware of a noticeable improvement when operating mobile along a sea coast road. The computer model predicted marked DX mobile performance of 3dB, plus a lower angle of radiation, provided that you are able to get fairly close to the sea.

So, now you know where to put the antenna, now get out and do it. But don't get your feet wet!

PW

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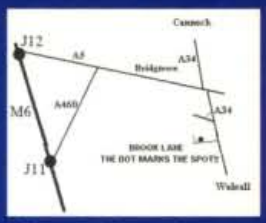

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AKD	6001	6m FM TRANSCEIVER	£135
ALINCO	DJ-580E	2/70CM HANDY TRANSCEIVER	£140
ALINCO	DJ-G1	HANDY TRANSCEIVER	£120
ALINCO	DJ-G5EY	DUAL BAND HANDY	£199
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ICOM	IC-275E	25W TRANSCEIVER	£525
ICOM	IC-275H	2M MULTIMODE 100W TRANSCEIVER	£575
ICOM	IC-290H	2M MULTIMODE MOBILE TRANSCEIVER	£250
ICOM	IC-2KL	AUTOMATIC LINEAR AMPLIFIER + PSU	£999
ICOM	IC-3230H	2-70CM MOBILE TRANSCEIVER	£160
ICOM	IC-471E	70CM BASE MULITMODE TRANSCEIVER	£299
ICOM	IC-490E	70cms MULTIMODE MOBILE TRANSCEIVER	£265
ICOM	IC-728	HF TRANSCEIVER	£399
ICOM	IC-730	HF TRANSCEIVER MINT!	£400
ICOM	IC-735	HF TRANSCEIVER	£400
ICOM	IC-737	HF BASE BUILT IN ATU 100W	£595
ICOM	IC-737	HF inc ATU BASE STATION TRANSCEIVER	£575
ICOM	IC-746	TRANSCEIVER	£899
ICOM	IC-756	HF / 6m All Band Transceiver	£999
ICOM	IC-756PRO	ICOM TRANSCEIVER	£1,699
ICOM	IC-765	HF BASE TRANSCEIVER	£800
ICOM	IC-775DSP	HF 200W BASE STATION TRANSCEIVER	£1,499
ICOM	IC-820	2-70CM BASE STATION 50Watt	£599
ICOM	IC-821H	VHF / UHF MULTIMODE TRANSCEIVER	£699
ICOM	IC-910	2/70 CM BASE TRANSCEIVER + 23CM UNIT	£1,100
ICOM	IC-R2	HANDY SCANNER	£99
ICOM	IC-R3	SCANNER + TV	£299
ICOM	IC-R7000	RECEIVER MINT! CONDITION	£550
ICOM	IC-R72	RECEIVER	£399
ICOM	IC-R75	HF / 6m RECEIVER	£475
ICOM	IC-T81E	QUAD BAND HANDY 2m/6m/23cm/70cm	£250
ICOM	IC-T8E	HANDY TRANSCEIVER	£175
ICOM	IC-W21E	HANDY TRANSCEIVER	£199
ICOM	PCR-1000	COMPUTER SCANNER	£200
ICOM	PS-15	20A POWER SUPPLY FITS ALL ICOM	£110
ICOM	PS-85	POWER SUPPLY	£175
ICOM	R-75	HF RECEIVER	£400
ICOM	SP-20	SPEAKER	£120
ICOM	SP-21	LOUDSPEAKER, BOXED	£55
ICOM	T-7E	2/70CM HANDY TRANSCEIVER	£170
ICOM	T-8E	2/70CM 6M HANDY TRANSCEIVER	£185
ICOM	UT-84	TONE SQUELCH UNIT	£25
ICOM	IC-2SET	2M HANDY	£89
ICOM	IC-R71E	RECEIVER	£399
JRC	JST-245 DSP	HF 50MHz 1500w AC BASE TRANSCEIVER	£1,295
JRC	NRD-535	HF RECEIVER	£600
KANTRONICS	KAM PLUS	TNC	£220
KENWOOD	DFC-230	FREQUENCY CONTROLLER	£70
KENWOOD	PS-20	10A POWER SUPPLY FITS TR-9130 ETC	£55
KENWOOD	PS-430	POWER SUPPLY	£100
KENWOOD	PS-50	POWER SUPPLY	£145
KENWOOD	R-5000	RECEIVER	£499
KENWOOD	SP-950	LOUDSPEAKER	£90
KENWOOD	SW-2000	SWR METER	£60
KENWOOD	TH-22E	2M HANDY TRANSCEIVER	£89
KENWOOD	TH-25E	HANDY TRANSCEIVER	£49
KENWOOD	TH-47E	HANDY TRANSCEIVER	£100
KENWOOD	TH-75E	2/70 HANDY TRANSCEIVER	£125
KENWOOD	TH-78E	2/70CM HANDY TRANSCEIVER	£175
KENWOOD	TH-79E	HANDY TRANSCEIVER	£189
KENWOOD	TL-922	HF LINEAR AMP 1Kw (AS NEW?)	£899
KENWOOD	TM-231E	2M MOBILE TRANSCEIVER	£120
KENWOOD	TM-241E	2M MOBILE TRANSCEIVER	£120
KENWOOD	TM-251E	MOBILE TRANSCEIVER	£140
KENWOOD	TM-255E	2m MULTI-MODE MOBILE TRANSCEIVER	£400
KENWOOD	TM-455E	70CM MULTIMODE MOBILE TRANSCEIVER	£495
KENWOOD	TM-733	2/70 MOBILE TRANSCEIVER	£225
KENWOOD	TR-751E	2M MULTIMODE TRANSCEIVER	£350
KENWOOD	TR-851E	70CM MULTIMODE MOBILE TRANSCEIVER	£395
KENWOOD	TS-120	HF SOLID STATE MOBILE	£225
KENWOOD	TS-450S	HF TRANSCEIVER	£499
KENWOOD	TS-450SAT	HF BUILT IN ATU EXCELLENT TRANSCEIVER	£575
KENWOOD	TS-530SP	HF MAINS 100Watt TRANSCEIVER	£275
KENWOOD	TS-680	HF 6M MOBILE/BASE TRANSCEIVER	£400
KENWOOD	TS-690SAT	HF 6M Inc ATU	£650
KENWOOD	TS-711E	SM BASE STATION TRANSCEIVER	£399
KENWOOD	TS-790E	2/70CM BASE STATION TRANSCEIVER	£699
KENWOOD	TS-790E	2m / 70cm MULTIMODE BASE TRANSCEIVER	£799
KENWOOD	TS-811E	70cms MULTIMODE BASE TRANSCEIVER	£399
KENWOOD	TS-830S	HF TRANSCEIVER	£325
KENWOOD	TS-850SAT	HF TRANSCEIVER MINT!	£800
KENWOOD	TS-870SAT	HF/DSP-IF-100W BUILT IN ATU TRANSCEIVER	£999
KENWOOD	TS-950SD	HF/ 150W DSP BASE TRANSCEIVER	£1,100
KENWOOD	TSB-2000	LATEST KENWOOD - COMPUTER CONTROLED	£1,299
KENWOOD	VFO-120		£50
KENWOOD	VFO-180	EXTERNAL VFO	£75
KENWOOD	VS-1	VOICE SYTHESISER	£30
KENWOOD	VS-2	VOICE SYTHESISER	£30
KENWOOD	YG-455CN-1	270Hz CW CRYSTAL FILTER	£100
KENWOOD	YK-88A-1	AM FILTER	£40
KENWOOD	YK-88C-1	500Hz CW NARROW FILTER	£40
KENWOOD	YK-88CN1	270Hz CW FILTER 8.83MHz IF	£40
KENWOOD	YK-88S-1	2.4KHz SSB NARROW FILTER 8.83MHz IF	£40
KENWOOD	YK-88SN	1.8K SSB FILTER (TS-440 /R5000)	£40
KENWOOD	YK-88SN-1	1.8KHz SSB NARROW FILTER 8.83MHz IF	£40
KENWOOD	PS-430	POWER SUPPLY	£120
LINEAR AMP	CHALLENGER II	CHALLENGER AMPLIFIER 11 2kW	£1,400
LOWE	HF-150	SW RECEIVER	£150
LOWE	HF-250	INCLUDES REMOTE CONTROL	£300
MCL	MCL1100	EASY READER	£75
MFJ	MFJ-414	MORSE CODE TRAINER	£120
MFJ	SET-UP	971-9015-4114 PORTABLE 21MHz	£299
MICROSET	PT-135	POWER SUPPLY	£80
MICROWAVE MODULES		28/144 TRANSVERTER 28/144	£125
PACCOM	TINY II	TNC	£99
PACCOM	TNC-320	TNC	£90
PLESSEY	PR-2250	HF RECEIVER BEST QUALITY CLASSIC!	£1,200
QM 70		28/144 TRANSVERTER	£100
RACAL	RACAL 1792	HF RECEIVER	£499
REALISTIC	PRO-2037	SCANNER BASE	£99
REALISTIC	PRO-394	HF RECIEVER	£99
SGC	SGC-2020	HF TRANSCEIVER	£450
SOMMERKAMP	FT290R	2m MULTI-MODE TRANSCEIVER	£180
SONY	ICF-SW77	FM/SW/MW/LW PORTABLE AS NEW!	£250
SONY	SW-100E	FM/SW/MW/LW PORTABLE	£90
ST3 HEADPHONES		DELUXE HEADPHONES	£45
SYNCRON	PS-1220VU	20 AMP POWER SUPPLY	£60
TAGRA		22AMP POWER SUPPLY	£70
TENTEC		SCOUT + MODULES	£350
TIMEWAVE	DSP-9+		£125
TOKYO HY-POWER		HL-30V 2M and 25W AMPLIFIER	£75
TOKYO HY-POWER		HL-37V LINEAR AMPLIFIER	£60
TONNA	7000E	TERMINAL	£130
TRIO	R-2000	RECEIVER + CONVERTER	£300
TRIO	TR-9130	2M ALL MODE TRANSCEIVER	£250
TRIO	TRIO 9130	2M MOBILE MULITMODE TRANSCEIVER	£250
TRIO	TS-780	DUAL BAND BASE TRANSCEIVER	£275
WELZ	AC-38M	200W MOBILE MATCHING NETWORK	£50
WELZ	SP-15M	SWR & POWER METER	£20
YAESU	FC-102	1.2KW ATU WITH 4 WAY SWITCHING UNIT	£200
YAESU	FC-20	AUTO ANTENNA TUNER FOR 847/FT100	£175
YAESU	FC-902	ATU 500W	£140
YAESU	FL-2100Z	HF AMPLIFIER	£450
YAESU	FP700	POWER SUPPLY	£100
YAESU	FP-757HD	HEAVY DUTY POWER SUPPLY	£120
YAESU	FRG-100	HF RECEIVER	£300
YAESU	FRG-7700	HF RECEIVER	£220
YAESU	FRG-8800	RECEIVER INCLUDES CONVERTER	£399
YAESU	FRT-7700	ATU MINT!	£75
YAESU	FRV-7700	UHF CONVERTER MINT!	£80
YAESU	FT-1000MK5	200W DSP HF TRANSCEIVER	£2,600
YAESU	FT-1000MP AC	HF BASE DSP TRANSCEIVER (Late serial no)	£1,550
YAESU	FT-1000MP DC	BASE TRANSCEIVER	£1,200
YAESU	FT-101ZDmk111	HF TRANSCEIVER inc FM	£375
YAESU	FT-225RD	2M BASE MULTIMODE CLASSIC!	£399
YAESU	FT-23R	HANDY TRANSCEIVER	£180
YAESU	FT-2500M	MOBILE TRANSCEIVER	£190
YAESU	FT-290RMK1	2M ALL MODE TRANSCEIVER	£180
YAESU	FT-290RMK11	MOBILE 2M MULTIMODE TRANSCEIVER	£275
YAESU	FT-411E	2M HANDY TRANSCEIVER	£99
YAESU	FT-41R	HANDY TRANSCEIVER	£120
YAESU	FT-470	2/70CM HANDY TRANSCEIVER	£140
YAESU	FT-650AC	26-50MHz 100w BASE SATATION TRANSCEIVER	£599
YAESU	FT-690MK11	6M MULTIMODE MOBILE TRANSCEIVER	£295
YAESU	FT-690RMK1	6M MULTIMODE MOBILE TRANSCEIVER	£250
YAESU	FT-690RMK11	6M PORTABLE	£375
YAESU	FT-726R	2 / 70 / HF TRANSCEIVER	£400
YAESU	FT-726R	2 / 70 / 6m TRANSCEIVER	£575
YAESU	FT-730R	70CM MOBILE TRANSCEIVER	£120
YAESU	FT-736R	2/70/6/23CM TRANSCEIVER	£1,050
YAESU	FT-736R	2m / 70cm TRANSCEIVER	£650
YAESU	FT-736R	2m / 70cm / 6m TRANSCEIVER	£750
YAESU	FT-7400	70cm MOBILE TRANSCEIVER	£160
YAESU	FT-747GX	HF TRANSCEIVER	£399
YAESU	FT-747GX	TRANSCEIVER	£299
YAESU	FT-757GXMK11	TRANSCEIVER MINT!	£400
YAESU	FT-757MK1GX	HF TRANSCEIVER	£375
YAESU	FT-767GX	HF BASE 100watt built-in ATU	£599
YAESU	FT-77	INCLUDES FM MINT!	£275
YAESU	FT-790R	70CM MULTIMODE MOBILE TRANSCEIVER	£225
YAESU	FT-7B	HF 50W MOBILE TRANSCEIVER	£199
YAESU	FT-80C	0-30MHz COMMERCIAL TRANSCEIVER	£375
YAESU	FT-8100	2/70cm MOBILE TRANSCEIVER	£249
YAESU	FT-811E	70CM HANDY TRANSCEIVER	£99
YAESU	FT-847	HF / 2 / 6 / 70cm BASE TRANSCEIVER	£999
YAESU	FT-900	HF TRANSCEIVER	£550
YAESU	FT-902DM	HF BASE TRANSCEIVER	£400
YAESU	FT-920AF	HF/6M BASE WITH DSP	£899
YAESU	FT-980	HF TRANSCEIVER	£495
YAESU	FT-990AC	HF BASE STATION TRANSCEIVER	£750
YAESU	FT-ONE	HF BASE TRANSCEIVER	£450
YAESU	FTV-901	TRANSVERTER Inc 2m Mod	£165
YAESU	FV-707	VFO UNIT	£99
YAESU	SP-8	LOUDSPEAKER Including Audio Filters	£100
YAESU	VFO-102	MINT CONDITION!	£199
YAESU	VR-5000	TOP RANGE SCANNER RECEIVER	£500
YAESU	VX-5R	2 / 70 / 6 HANDIE 5W	£220
YAESU	XF-1143N	2KHz SSB FILTER	£60
YAESU	YO-100	SCOPE VERY RARE!	£150
YAESU	YS-60	SWR METER 1.6 - 60MHz	£30
YUPITERU	MVT-7000	HANDY SCANNER	£99
ZETAGI	B-132	10 / 11m LINEAR AMPLIFIER, MAINS	£60

Valve&Vintage

The traditional brown dust-coat confirms it's Phil Cadman G4JCP behind the vintage 'wireless shop' counter this month. And is that an old B44 lurking on the shelf amongst the 90/1.5V battery portables? - read on to find out!

Welcome, happy wanderers, to the Valve and Vintage 'shop'. The improved weather here in the Midlands has enticed me out of my workshop. And quite by chance, this edition of V&V features a couple of topics which have outdoor associations.

While leafing through some old RSGB *Bulletins* (now *RadCom*) late last year, I came across a letter written by **Robert Tarr G3PWR**. Bob explained how the 70MHz a.m. calling frequency - 70.260MHz - came about. It's worth a mention here, particularly as Summer 2002 (possibly the month of June) is the 40th anniversary of the first real use of 70.260MHz as a calling and working frequency.

Although the 70MHz band was originally popularised with the help of the surplus B44 transceiver, a large number of Amateurs used surplus converted commercial p.m.r. equipment (including G4JCP!). Pictured are two old favourites - the Pye Westminster (top) and Cambridge below (see text).

First Allocated

The 70MHz band was first allocated to Amateur Radio in the UK in late 1956. It was secured (after a fight) as a replacement for the 58.5 to 60MHz band which had been lost when television took over. When first introduced the band was less than half its present allocation: just 70.200 to 70.400MHz.

I'm not sure how much activity there was on 70MHz in those early years (I'm too young!) but by the early 1960s a surplus military radio, the **B44 MkI**, a self-contained single-channel v.h.f. transceiver arrived. Easily converted, it required a 12V d.c. supply...ideal for mobile use. Huge by today's standards, they fitted in many popular cars of the time.

A group of south coast Amateurs - initially **Robert Tarr G3PUR**, **Fred Robins G3GVM** and **Don Hayter G3JHM** - purchased some B44s for 70MHz use. And now I have to be a little diplomatic! Why? Well...there's some debate as to exactly why 70.260MHz was chosen!

The letter in the RSGB *Bulletin* stated that the frequency **should have been 70.300MHz** and that the crystals for 70.260MHz were ordered in error. (I've had this explanation confirmed quite recently).

Around that time there was an American surplus crystal available which could be used to put the B44's receiver on 70.260MHz. As the B44's transmit crystal had to be specially ordered regardless, there was no cost difference between transmitting on 70.260MHz as opposed to 70.300MHz. Naturally, because a cheap receive crystal was available 70.260MHz won. Whatever the reason...the frequency does celebrate its 40th anniversary this year!

Many Converted

In time, many B44s were bought and converted to 70MHz. And as you can imagine, 70.260MHz got more than a little crowded at times.

Sets were modified to operate on more than one frequency and some Amateurs even made the receiver fully tuneable. But throughout, 70.260MHz steadfastly remained the calling frequency.

To commemorate the 40th anniversary, might I suggest that anyone who has an old (or new) 70MHz set, puts it on the air this Summer...**on 70.260MHz a.m., of course**. Why not make a 70MHz whip so you can operate mobile?

Although B44s are not so common now, there must be many old 70MHz p.m.r. sets tucked away in sheds and attics. Two examples - from my own attic to - are pictured: the **Pye Cambridge** and **Pye Westminster**. Two lovely sets (well, I think so) that still work well. The reason I've always liked most about them is how easy they are to work on. A world away from today's tiny sets and miniature components!

Portable Valved Receivers

Both the Editor and I have a liking for the post Second World War battery-powered, portable valved radios. But of course, in the very early days of radio, all sets ran off batteries. Later, those lucky enough to have a mains electricity supply could use a battery eliminator to save on cost.

With the development of indirectly heated valves, mains-powered radios quickly ousted battery sets. But for those areas without the mains, and for truly portable use, the battery set still had an important place.

Following the introduction of miniature (B7G based) valves and the layer-type h.t. battery, the battery portable became a stylish source of mobile entertainment. No picnic was complete without one!

The portable valved sets were only a little larger in size than the first transistor portables. Indeed, the first transistor radio my family owned - a **Kolster-Brandes Rhapsody** - looked identical to its valved counterpart, which was, confusingly, also called the Rhapsody.

Actually, the name was a source of annoyance to me. When I sent off for a service sheet for the transistorised Rhapsody, I got the one for the valved version! Since

then I've come across four different versions of the KB Rhapsody, plus two versions of the Rhapsody Deluxe.

Many battery sets are still working happily, and most of their components can still be obtained should they fail. Unfortunately, the same cannot be said for the batteries.

When mains electricity finally arrived in the remoter parts of the UK, battery sets either had eliminators fitted or were displaced by mains powered sets. And once introduced, transistorised portables rapidly replaced valved counterparts, despite often being more expensive.

The inevitable result was that battery manufacturers quickly moved away from making l.t. and h.t. batteries and began to produce batteries specifically designed to power transistor sets. Batteries for valved sets rose steeply in price and with dwindling demand, were soon discontinued.

Anyone lucky enough to actually have an old battery can always remove the innards, replacing them with modern batteries. Of course, to make an h.t. battery, several (usually 9V PP3s) batteries have to be wired in series. Whether dry or rechargeable cells are used, the cost is rather prohibitive.

Help is now at hand on two fronts. Firstly, the combination of modern electronics and high capacity nickel metal hydride cells means that high voltages can be generated efficiently from low voltage sources. Secondly, there's a website on the Internet that has scans of obsolete batteries.

As you can see from the photographs, someone has 'unwrapped' an original battery and laid the card case flat on a scanner. The resulting image was then copied to a web server. To re-create the appearance of the original battery, the image is downloaded and printed as close as possible to full-size on card or photo-quality paper.

The battery case can then be cut out, folded and glued to make a passable likeness of the original. Even my rushed attempt at producing (cosmetic only) batteries for my **Vidor CN381B** portable was surprisingly successful.

The battery images are available from **http://www.roberts-radios.co.uk/** No, the site has nothing to do with the company that markets radios under the brand name of **Roberts**. The guy just happens to be named Robert and the website is devoted to his collection of radios.

Unfortunately, the scans are not all to scale, so it's important to know the size of the original battery before trying to print out a copy. To help, I've put some information in the **Data and Documents** area of my website at **http://www.valveandvintage.co.uk/data**

For those who don't have Internet access, I can supply the information I have on battery sizes on receipt of an s.a.s.e. But if you want the battery images, you'll have to find someone who has Internet access and a colour printer.

Whether you use NiMH cells plus a d.c. to d.c. converter or a collection of dry batteries to recreate your battery, the one thing you probably will be stuck for is the battery's power socket. Although I removed the sockets from many batteries over the years, I never kept a single one. Much to my regret.

I ask anyone who has a battery that isn't manufactured any more to preserve both the outer case and the connector. Also, if anyone has any detailed battery information - engineering data and the like, the sort of thing that equipment and radio designers would have needed - can they preserve that also. **In short, whatever you have, don't throw it away.**

Robert's radio site is a good start, but I'd like to see a permanent, comprehensive collection of battery data assembled and as much information as possible made available on the Internet. Maybe a contemporary battery manufacturer could be persuaded to host the site. **Any takers?**

I must also apologise for yet again bringing the Internet into this column. Not everyone has Internet access, and some people don't even like computers (I sometimes know how they feel). And after all, there's nothing 'valve' or 'vintage' about the Net (save for the c.r.t. in your computer's monitor). Despite this, I find that the Net is fast becoming an essential means of disseminating and obtaining information that would otherwise be very hard to share.

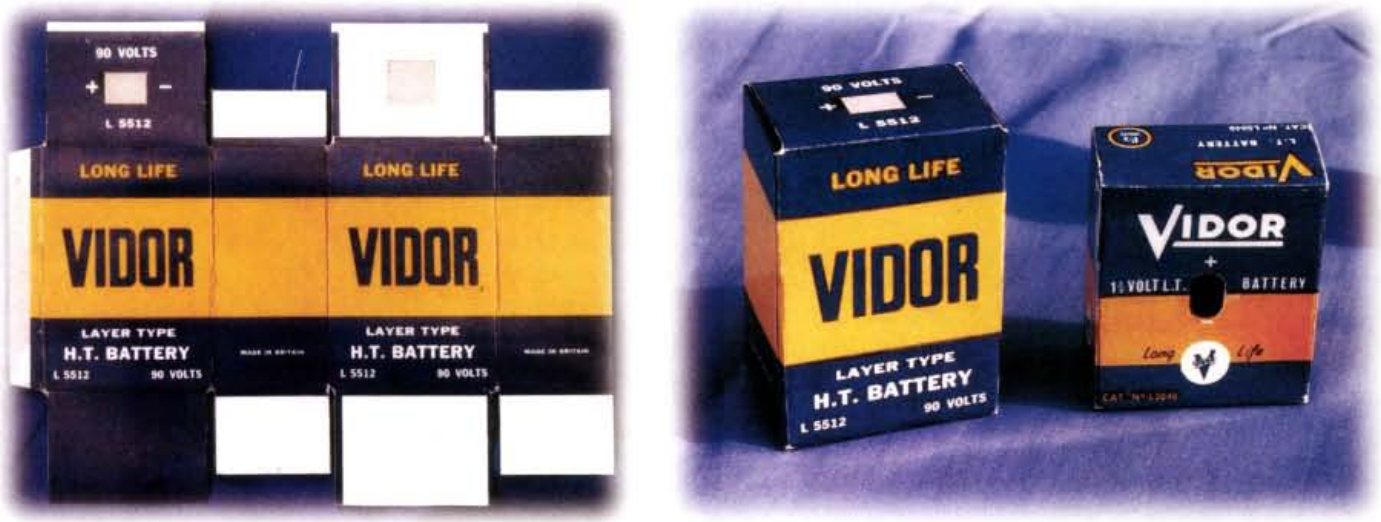
Ah, my 'low-battery' indicator has just lit up. Just time to thank **Ken Bolton G0SEK** from Folkestone for sending me information on Osmor coils and Wright & Weare components. Much of what Ken sent me should be in the **Data and Documents** section of my web site by the time you read this (URL as above). And thank you also to **John Barrington Gray** of the **Vintage British Radio Components Company** for the information he kindly sent about **F.G. Rayer's** low voltage receivers.

John made a point about pin 1 on the 6K7/G/GT. In general, metal valves have pin 1 connected to the metal shell of the valve. Similarly, those 'GT' types (like the 6K7GT) which have a metal base sleeve, have the sleeve connected to pin 1. **When using either type of valve, please remember to connect pin 1 on the valve holder to earth.**

Pin 1 on an octal valve holder should never be used as a tie point. If pin 1 isn't used then it should either be left open or, better still, connected to earth. That way, any version of valve - metal/G/GT - can be substituted without strange things happening because the metal screen isn't grounded.

Please send your comments and letters to me either via the *PW* offices, via E-mail to **phil@valveandvintage.co.uk** or direct to: **21 Scotts Green Close, Scotts Green, Dudley, West Midlands DY1 2DX.** Hope to hear you on 70.260MHz!

PW



● Fig. 1: With the help of the Internet you can make facsimiles of battery casings but to fill them you need modern re-chargeable batteries! (See text).

VHF DXER

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REPORTS & INFORMATION BY THE LAST SATURDAY OF EACH MONTH.

THIS MONTH DAVID BUTLER G4ASR HAS YOUR ALL YOUR REPORTS AND MAKES A PROPAGATION PREDICTION

In a recent propagation forecast I predicted that most, if not all, of the world-wide F2-layer propagation being experienced on the 50MHz band would disappear during March. I also remarked that the prevalent mode on 50MHz during March would be trans-equatorial propagation (t.e.p.) to southern Africa. This was exactly the case.

There were indeed very few F2 openings and all of these occurred during the first week or so of the month. Single or double-hop contacts were reported with the stations of A45XR (Oman), D44TA (Cape Verde), HZ1MD and 7Z1SJ (Saudi Arabia), JY9NX (Jordan) and J28EX (Djibouti). The only really long distance contacts were made on March 3 between 0930-1130UTC with the stations of DU1/GM4COK (Philippines) and VU2ZAP (India). The station of VK6JQ (Australia) made a brief appearance around 1130UTC on March 12 but few UK stations managed to contact him.

The Australian beacon VK6RSX (50.304MHz) continued to be reported throughout the UK by many stations. It was heard on March 1-4, 10-12 and 16-17. The last reported reception of this beacon came from the station of GI6ATZ who copied it peaking 539 at 1030UTC on March 17. Incidentally, the first report during this winter's F2 season was by the station of G7EXO who copied VK6RSX peaking 539 at 0842UTC on October 17. That's exactly five months of world-wide propagation.

I hope you didn't miss it as you now need to wait another 11-years! On the other hand the F2 conditions may be reasonable this coming winter but there is no guarantee.

Trans-equatorial propagation during March was very good with openings virtually every day. The only exception to this was during the period March 17-23 when coronal wind activity severely disturbed the relatively settled conditions. The majority of c.w. and s.s.b. contacts were made with stations in the ZS6 (Transvaal, South Africa) call area with the stations of ZS6AXT and ZS6WB being particularly active.

A few UK operators managed to find activity further south with the stations of ZS4BFN/P and ZS4TX (Orange Free State) and ZR5ADQ (Natal). Other African DX worked on the 50MHz band during March were the stations of FR1GZ and FR5DN (Reunion Is.), TR8CA (Gabon), TT8DX (Chad), V51E, V51LK, V51/SP6IXF and V51/ZS4NS (Namibia), ZD8DB (Ascension Is.), Z22JE (Zimbabwe) and 5N6NDB (Nigeria).

The rare country of Lesotho was activated on Saturday March 16 by **Bernie ZS4TX** operating with the callsign **7P8Z**. He contacted 23 G-stations and a number in Wales. The first contact was with G3WZT at 1223UTC and the last station contacted was G3CEG at 1447UTC. In between were the stations of G3NVO, G4ASR, G4RGK, G4IGO, G0JHC, G3FPQ, G6EFX, G0LCS, G8BCG/P, G3VYF, G4FUF, G3IMV, G4WJS, G3IBI, G8WXU, M0BCG, G3WOS, G3NSM, G0EVT, G4CCZ and G4HBA. Well done to everyone for working a new DXCC country.

During the month there were a number of weak auroral back-scatter events. The strongest of these occurred on March 24 between 1600-1800UTC with c.w. and s.s.b. contacts being reported on the 50, 70 and 144MHz bands. Most traffic on the 50MHz band was between stations located in Scotland, England and Wales. There was more DX to be found on the 144MHz band with a number of UK operators reporting c.w. contacts with the stations of LA6OJ (Norway), LY2IC (Lithuania), SM4IVE and SK7MW (Sweden).

Tropospheric conditions on the 144 and 430MHz bands were generally poor during March. There was however, an unexpected opening to the north coast of Spain in the period March 22-24. The stations of EA1CRK and EA1EBJ (both in IN73) reported working G and GW-stations on the 144MHz band as far north as IO94 (Yorkshire).

On March 28 there was enhanced tropo ducting across the North Sea enabling stations situated on the east coast of England and Scotland to make contacts into Denmark, Norway and Sweden. Some of the stations reported worked on the 144MHz band included LA2PHA, OZ1IEP, OZ1QZ, SK7MW and SM6TZX.

STATION REPORTS

Conditions on the 50MHz band at my QTH (Herefordshire IO81) were reasonably good during the first few days of March. On March 1 at 1140UTC an s.s.b. contact was made with the station of 7Z1SJ (LL25). Between 1220-1330UTC I made c.w. QSOs with the stations of ZS6AVP (KG44), ZS6AXT (KG33), ZS6NK (KG46) and ZS6WB (KG44).

On March 3 contacts were made on s.s.b. with VU2ZAP (MK82) at 1143UTC, ZR6DXB (KG33) at 1243UTC and TT8DX (JJ88) at 1245TC. Finally, on March 16 I contacted the stations of FR1GZ (LG79) on s.s.b. and FR5DN on c.w. Both contacts were made around 1020UTC. A little later at 1340UTC a c.w. contact was made with 7P8Z for a new country.

Incidentally, I'm using a Kenwood TS-690S transceiver and a pair of 6-element DJ9BV Yagis at 20m above ground. Big antennas work really well at 50MHz! That's not to say you can't work DX with smaller antennas. Often though, many of the openings on 50MHz are marginal and a single small Yagi won't be sufficient to enable you to hear all the DX stations during these brief events.

I'm sorry, but the only answer is to get as much metalwork up in the sky if you want to work DX consistently. Many top stations are using stacked Yagis or a single Yagi with a boom length of 10m or greater.

Carl Mason GW0VSW (Neath IO71) mentions that he has not had much success on the 50MHz band recently. He did hear ZS6AXT on March 14 but that station was only peaking around 529. Carl uses an Icom IC-706 transceiver and a Cushcraft AR-6 vertical antenna. His best DX so far with this set-up is a contact with a station in Portugal. (This was probably made during the Sporadic-E season when signals are enormously loud.).

Carl Peake G0NZI (Warwickshire IO92) reports that he recently built the PW Meon 50MHz transverter and was ready to test it, unboxed and with wires everywhere. Using an Icom IC-202S transceiver as a drive source and an indoor inverted Vee antenna in the loft he tuned the band and was surprised to hear the station of VE1YX (Canada).

With the help of a home-made 5W amplifier Carl called VE1YX on s.s.b. and was very pleased to make a two-way contact receiving a 56 report. All from a couple of printed circuit boards and a rats nest of wires on the bench!

Carl mentions that since completing the

project he has built two more PW Meon transverters. If you're contemplating building this simple transverter you can E-mail Carl at **the.peakes@ntlworld.com** for further advice.

Jamie Ashford GW7SMV (Monmouthshire IO81) runs 170W output into a 5-element (6M2X) Yagi. At the time of writing he had worked stations in 156 DXCC countries and 650 locator squares. His recent contacts included the stations of DU1/GM4COK, TR8CA, VK6JQ, V51/SP6IXF and ZS6XJ.

PROPAGATION FORECAST

A 'station' telephoned recently asking why he could hear very little of the DX stations that I and others regularly work on the 50MHz band. He's located on a reasonable site and using a modern transceiver with a 3-element Yagi.

On the face of it his system should be capable of hearing much of the DX that appears on the band. My first question was what type of propagation was he expecting that day? He didn't know but said that he regularly listens to the GB3MCB beacon (50.0425MHz) in Cornwall. He continued by mentioning that when it's a good signal he calls for DX to the west and south-west of his QTH. And that answers the question why he was not hearing any DX stations. He didn't know what to expect and he was beaming in totally the wrong direction!

First and foremost it's important to recognise that seasonal propagation changes occur on the 50MHz band and that this has an dramatic effect on the directions in which the DX stations are coming from. Secondly and probably just as important, it's a total waste of time using a local 50MHz beacon as a meaningful propagation indicator.

Signals from beacons a few hundred kilometres away are normally received via ground wave tropo propagation. Tropospheric propagation on the 50MHz band has **no**, repeat no, bearing on the ionospheric DX modes which are prevalent at these frequencies.

Aurora, F2, Sporadic-E and Trans-equatorial propagation all occur in the ionised layers way above the surface of the Earth. Of course as you move up in frequency to the 144 and 430MHz bands the more normal propagation **is** via the troposphere. These are the frequency bands where you may usefully use a national beacon to see if conditions are up.

To be a successful DXer you **must** have an understanding of the probability that something will happen at certain times and in specific directions. So, here's my propagation forecast for the period mid-May to mid-June. As with all forecasts (especially mine!) it's a generalisation but it should be reasonably accurate.

During the period propagation on the 50MHz band will be determined by three propagation modes, trans-equatorial, Sporadic-E and aurora. Of these t.e.p. will provide the longest distance contacts of around 7000-9000 kilometres. During March-April the t.e.p. path was due south of the UK deep into Africa.

● Peter Day G3PHO (left) receiving the 10GHz Contest Trophy from RSGB President Bob Whelan G3PJT at the recent 50MHz to Microwaves Convention.

By early May the t.e.p. path normally shifts toward South America with contacts being made with stations in Argentina (LU) and Uruguay (CX) on a beam-heading of 225°. Most openings should occur between 1800-2000UTC, sometimes an hour or so earlier if conditions are good.

On a very few occasions events can occur as early as 1500UTC. There is always a chance of the isolated t.e.p. opening to Africa between 1300-1500UTC and 1700-1800UTC but these will not be so prevalent as the South American path.

By early June the t.e.p. openings will diminish although there will still be brief events for the very alert DXer. Although these type of openings favour stations located in southern England the skip distance often extends enabling stations in northern UK to participate.

During May there could well be Sp-E openings on a daily basis and this will extend up to the 70MHz band enabling DX contacts to be made with stations in Slovenia (S5). The summer period is an excellent time to be active on the 50MHz band with low power and a small antenna.

Signals can be rock-crushingly strong and it's very easy to make dozens of contacts with QRP powers. Basically the propagation will encompass all of Europe with single-hop contacts up to 2000km being easily made. The direction of propagation will vary daily, sometimes on an hourly basis. Openings will occur during daylight hours often extending into the evening period.

Propagation during June will become very intense and multi-hop paths will form enabling contacts to be made into the Middle East and North Africa. One of the most exciting multi-hop paths is across the Atlantic Ocean to North America. These events normally occur between 1800-2200UTC, sometimes earlier, sometimes later.

During the last week of May and throughout June you should pay particular attention to Sp-E openings occurring on the 144MHz band. These are really exciting with some events lasting for an hour or so.

I always catch openings on the 144MHz band by listening to the intensity of openings on lower frequencies. If the opening on the 50MHz band is particularly strong there's every chance that it will appear on the 144MHz band. Only experience will tell you what is 'particularly strong'.

Keep a look out for all the usual indicators of impending auroral activity. The easiest way is to check relevant Internet websites. Although auroral back-scatter openings should be diminishing at this time of year some of the largest events have occurred in May and June. You can never be sure what the Sun will get up to but because of the enormous distance from the Earth you always get around 36-48 hours notice of possible events. When an event is in progress always beam north. The best DX will often be found around 040-060°.

There is one major meteor shower during the period and three minor streams. The Arietids meteor shower occurs between May 13 to June 18 peaking around June 8. The shower rises at 0300UTC and sets at 1600UTC. From the UK the best direction will be north-east at 0700UTC, east at 0900UTC and south-east at 1100UTC.

The minor showers are the Piscids peaking on May 7, the Nu Piscids with maximum activity on May 12 and the Zeta Perseids peaking on June 8, the same day as the Arietids shower. These three streams have similar rise and sets times being above the horizon between 0200-1800UTC. Activity will be found on high speed c.w. around 144.100MHz, on s.s.b. around 144.200MHz and on FSK441 and JT44 (another new digital mode!) around 144.370MHz.

DEADLINES

Let me know if the propagation forecast has been of use and whether you managed to work any DX on the v.h.f. bands Please forward any reports or comments, preferably by E-mail, by the date given at the top of the column.

Thanks for your letters and good luck with the DX. See you next month.

73. David G4ASR

HF HIGHLIGHTS

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REPORTS, INFORMATION AND PHOTOGRAPHS TO ME PLEASE BY THE 15TH OF EACH MONTH.

Tom Kelly EI2AJ, Dublin, Republic of Ireland starts us off. Tom say's "I've operated a c.w. QRP station for the past 41 years starting with my first rig, the famous 'B2'. Each February the South Dublin Radio Club run a Spring Challenge in which the participants work as many DX countries as possible during the month. This challenge is not a contest as only normal QSOs count and contacts with any contest stations are not allowed.

"I was lucky enough to win the QRP section in 2000 so was keen to do well this year. I entered the Restricted Section/CW/One Band using my Index QRP Plus and a half-size G5RV. Running just 5W on 14MHz I worked 50 countries including 8P8 (Barbados), VK (Australia), VU (India), PJ2 (Netherland Antilles) and PJ8 (St Maarten)".

Many thanks for your letter Tom, it sounds like you enjoyed yourself and good luck in the challenge.

AIR AMBULANCE - WALES

The **Mid-Glamorgan Amateur Radio Group** operated as **GB0AAW** in March to promote interest in the Air Ambulance Service Wales. The helicopter costs over £53,000 a month to keep flying and has already made over 300 missions and carried 200 patients!

The successful three-day operation from Swansea Airport resulted in many h.f. contacts on all bands. Best DX was ZL1JON in New Zealand on 18MHz s.s.b. and JA7QFU on 21MHz c.w.

SPECIAL EVENT - GB0SGI

The Warrington Amateur Radio Club are still receiving QSL cards for the special event station they ran on St. Georges Island EU-120 with 'Please QSL' on them. Club member **Ron Davies G0WJX** has said that all contacts with **GB0SGI** have been confirmed.

On receipt, all QSL cards are checked against their log and if a discrepancy is found a new card is sent. They suspect that some cards have crossed in the post. If anyone is still without that vital confirmation an E-mail to **ron-g0wjx@warc.org.uk** with the contact details will allow the log to be checked and the QSO confirmed.

Ron also mentions that a number of cards directed to DARC (Germany) have been returned as the organisation is not a member. A problem that I have also experienced over the past few years!

DX OPERATION

Chris Vernon G0TQJ hopes to be active from Afghanistan for three months starting in mid-April. Chris will be taking his FT-890 and a Windom antenna with him and if permission is granted will operate mainly s.s.b. and RTTY as work allows. (QSLs will be good via the home-call).

SPECIAL EVENTS

The **South Flanders DX Activity Group** will be active on the 1 & 2nd June from the historical Pegasus Bridge Memorial Museum in Ranville (Normandy-France). This event is to commemorate the 58th anniversary of the D-Day Landings on the 6 June 1944 and the capture of the bridge by members of the British 6th Airborne Division.

The callsign used should be **F/ON6JUN/P** and QSLs for this special event should go via the event co-ordinator **Victor Ravyts ON6BV**. Further information can be found at **www.qsl.net/on6jun/**

Keep an ear open for **Dom F5SJB** who will be operating as **TM5CW** from 18 May until 1 June. Activity will be on all bands both QRO and QRP. This callsign is valid for the Lons-le-Saunier City Telegraphy Award and QSLs are good via the bureau or direct to **Dominique Meige, F-39130 Hautecour, France**.

The Mid-Glamorgan Amateur Radio Group operated as GB0AAW in March to promote interest in the Air Ambulance Service Wales.

YOUR REPORTS

Starting with the log of **Robin Trebilcock GW3ZCF**, Bishopston near Swansea, Robin spent some time on 10MHz using his IC-775DSP and 47MHz horizontal loop. Contacts made 'on the key' include TI9M (Cocos Island) 0933, H7DX (Nicaragua) 0948 followed later by ZF2TN at 2336UTC.

THE 14 & 18MHz BANDS

The log of **Martyn Medcalf M3VAM**, Chelmsford, Essex lists contacts with EW8AM (Belarus), CT1EDA (Portugal), PA3GGB (Netherlands), SV1DKR (Greece), LZ2KV (Bulgaria), RV6LED (European Russia), VE3AT (Canada), N2NT (USA) between 0815 and 1800UTC and 9K2OD (Kuwait) at 0037UTC. Martin uses an IC-746 and SGC-237 tuner with 27ft of wire.

Mike Baker G3SUK, Stowmarket, Suffolk has been busy doing 'other things' this month. Working as part of a group Mike has been helping to write a Salvation Army Emergency Response Training Manual for use here in the UK. However, Mike did manage a brief spell on 18MHz s.s.b. making contact with H4OT (Solomon Islands) at 0824 and HK6LEM (Hawaiian Islands) at 1710UTC using a IC-746, 80W and a Carolina Windom.

THE 21 & 24MHz BANDS

All c.w. man **Ted Trowell G2HKU**, Isle of Sheppy, Kent has had a very busy month working on most bands. Stations worked on 21MHz include PU1VHJ (Brazil) 1100, DS5USH (South Korea) and 7X5OD (Algeria) at 1600 followed by 5U4R (Niger) and 8P9IF (Barbados) at 200UTC all around 1900UTC.

In Kendal, Cumbria **Roy Walker G0TAK** enjoyed 5W c.w. contacts on 24MHz working YL2GN (Latvia) 1441, UA2FCB (Kaliningradsk) 1446, LY1DR (Lithuania)1347 and TA3DD (Turkey) at 1353UTC. All contacts made using an Index QRP Plus, Alinco EDX tuner and 3.5MHz long wire loop.

CARL MASON GW0VSW HAS LOTS TO PACK IN THIS MONTH, SO LETS SEE HOW BUSY THE HF BANDS HAVE BEEN!

THE 28MHz BAND

Owen Williams G0PHY, Biggleswade, Bedfordshire has spent a good deal of time trying to work several of the recent DXpeditions. His 28MHz s.s.b. contacts this month include ET3PMW (Ethiopia), PW0T (Trindade Island) SA-010 and TI9M (Cocos Island). Other contacts included 9L1DX (Sierra Leone) already confirmed by EA4CEN and FR5FD (Reunion) AF-005. All contacts were made using a FT-747, 100W and a dipole.

Also busy on this band was new reporter **Graham Stone 2E0GDX,** who has just worked his 92nd country using a IC-746 and Cushcraft R8000 vertical. His logbook this month shows contacts with D44TD (Cape Verde), JA9NFO (Japan), VU2PEB (India), HL3SF (South Korea) and VK2SZ (Australia). Graham is interested to know if any other Novice/Intermediate licensees have managed to work VK? Nice to hear from you Graham and keep up the good work!

SIGNING OFF

That about wraps it up for another month and my thanks to everyone who has contributed to the column. I hope I have managed to fit you all in!

73. Carl GW0VSW

Trader's Table

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Yaesu FT-690R II 6m All Mode Portable 2.5W £299
Yaesu FT-790R II 70cm All Mode Portable 2.5W £249
Yaesu FT-2500M 2m FM Mil. Spec Mobile 50W £169
Yaesu FT-5200 x3 2m,70cm FM Mobile 50W,35W £225

VHF/UHF HAND HELD TRANSCEIVER

ADI AT-201 2m FM Battery box 130-170MHz RX £99
ADI AT-400 70cm FM Battery box 420-465MHz RX £115
ADI AT-600 2m,70cm FM H/Held,Wide RX,Full Duplex £175
ADI Sender 145 2m FM H/Held with Battery box £95
Alinco DJ-180 2m FM H/Held £89
Alinco DJ-580 2m/70cm FM H/Held Full Duplex Airband RX £145
Alinco DJ-G5 2m/70cm FM with wide RX £169
Icom IC-25ET 2m FM H/Held £99
Icom IC-A2E Civil Airband H/Held Transceiver £199
Icom IC-P2ET 2m FM H/Held £89
Icom IC-T7E 2m/70cm FM with wide RX £199
Icom IC-T22A 2m FM H/Held £119
Kenwood TH-D7E 2m,70cm FM Palm Held with Wide RX and TNC £249
Standard C-108 ±2 2m FM H/Held £89
Yaesu FT-41R ±2 70cm FM Handy with Wide RX £99

SHORTWAVE RECEIVERS

Grundig YB-400PE Portable Receiver with FM stereo and SSB £89
JRC NRD-525 90kHz-34MHz All Mode Receiver 200Ch. Mains £529
Kenwood R-5000 100kHz-30MHz All Mode Receiver Mains £499
Lowe HF-150 30kHz-30MHz AE Mode 12V £199
Lowe HF-225 30kHz-30MHz All Mode Receiver 12V £249
Lowe HF-250 30kHz-30MHz Receiver 12V PC Compatible £325
Roberts R-809 Portable 153kHz-30MHz AM,FM stereo £59
Sony ICF-SW100E Pocket Receiver with FM stereo and SSB £115
Sony ICF-SW7600D Portable Receiver with FM stereo and SSB £79
Yaesu FRG-100 50kHz 30MHz AM,CW,SSB 12V with PSU £325

SCANNERS MOBILE/BASE

Yaesu VR-5000 100kHz-2600MHz All Mode Receiver 2000Ch. 12V £399

SCANNERS HAND HELD

Alinco DJ-X10 100kHz-2000MHz All Mode 1200Ch. £199
AOR AR-8000 ±4 500kHz-1300MHz All Mode 1000Ch. £199
AOR AR-8200 ß ±2 53kHz-2040MHz All Mode 1000Ch. £299
Steepletone SAH-2000 MW,FM,Airband,Marine Digital Radio £35

STATION ACCESSORIES

AEA PK-232MBX PakRat Multimode Data Controller £185
AEA PK-900 Simultaneous Dual Port TNC £299
AKD WA-2 50-210MHz VHF Wavemeter £25
Amertron ALS-600XCE 10-160m Solid State 600W Amplifier £899
AOR SDU-5000 Spectrum Display Unit for Receivers £249
BNOS LPM-144-10-100 2m Linear Amp 10W in , 100W out with Preamp £139
Daiwa LA-2080H 2m 1-5W in,80W out + GaAsFET Pre-amp £99
Datong FL-3 Multimode Filter with Auto Notch £99
Diamond GSV-4000 12V variable 40A Regulated PSU with meters £109
Diamond SX-100 1.6-60MHZ SWR,PWR meter 3kW £69
ICS AMT-3 RTTY,AMTOR & CW Terminal (P.Sale) £50
ICS FAX-1 Weather Fax , NAVTEX , RTTY Decoder £125
Icom PS-85 13.8V 20A Matching PSU £179
Icom SP-3 Matching Extension Speaker £39
JPS NIR-10 Noise / Interference Reduction Unit £199
JPS NTR-1 DSP Noise Reducer £99
Kantronics KAM Plus Multimode Data Controller with Packet, Dual Port £199
Kenwood ESP-100 Matching Digital Signal Processor for TS-850 ..... £190
Kenwood VC-H1 Visual Communication;Colour LCD , SSTV £169
MFJ MFJ-247 1.8-30MHz Digital SWR Analyser £129
MFJ MFJ-411 Personal Morse Tutor £45
MFJ MFJ-452 CW Keyboard + Perpetual Memory 2 Line 16 character £99
MFJ MFJ-462B RTTY,ASCII,CW,AMTOR Reader with Display £119
MFJ MFJ-1021A 0.3MHz Indoor Active SWL Antenna £65
MFJ MFJ-1274 HF / VHF TNC + 1284M software (P.Sale) £100
MFJ MFJ-1278BX Multimode 10 mode Data Controller with Packet £225
MFJ MFJ-1286M IBM Multimode Control Software £49
MFJ MFJ-1289W IBM Multimode Control Software for Windows £49
MFJ MFJ-1610 Theory Tutor (Novice) £4
Microset R-50 2m 1-7W in,50W out all mode + GaAsFET Pre-amp £59
M.Modules MMC-144-28 2m Frequency Converter 28MHz IF £10
Opto 3000A + 10Hz-3GHz Frequency Counter £289
Opto Micro-RF Pager sized micro RF Detector £69
PacComm Pico-2 Miniature 1200 Baud Dual Port Packet Modem £149
Standard P-335 2m Amp 3W in , 30W out £39
Timewave DSP-9+ Audio Noise Filter with Gain Control £129
Timewave DSP-599ZX Audio Noise Reduction Unit £149
Watson W-5A 12V Fixed 5A PSU £20
Watson WDB-30 2m, 70cm Dualband Amplifier 35W out, 6W in £99
Watson WMM-1 Multimode Modem £49
Yaesu FL-2025 ±2 2m clip-on 25W Linear (for FT-290R II) £99
Yaesu MD-1B8 Desk Mic 1.3k/600ohm £69

MISCELLANEOUS

Albrecht AE-2850 40ch 4w CEPT Hand Held £50
Garmin GPS-12CX Hand held 12Ch. 500 Waypoints with 4 colour screen £179
Garmin GPS-III + 12Ch. 500 Waypoints,BackTrack with MAP £249

KEYBOARD COMMS

BY ROGER COOKE G3LDI
THE OLD NURSERY
THE DRIFT, SWARDESTON
NORWICH, NORFOLK NR14 8LQ
TEL: (01508) 570278
E-MAIL: rcooke@g3ldi.freeserve.co.uk
PACKET: G3LDI @ GB7LDI

Following on from last month's column, in which I presented some information regarding Pactor III, I visited the SCS website and found the following information. For those Amateurs who wish to pursue the latest Data modes on h.f., this is the way to go. It's relatively expensive, but the equipment is very well engineered and supported in the way of software upgrades, available from the website.

Pactor is a very robust mode suited admirably for h.f. and the advancements offered with Pactor III are very desirable. At present, there are three units available; PTC-IIpro, PTC-II and the PTC-IIE. Up until now, Pactor II has been the standard, but these units can all be up-graded to the new Pactor III.

Pactor-III is the new data transmission mode which is superior to Pactor-II in both speed and robustness. To use Pactor-III both transmitting and receiving stations must support Pactor-III. If you are a mobile station transmitting to a land based station both mobile and land stations must be in Pactor-III mode in order to benefit from the higher data rates Pactor-III mode offer.

The Pactor-III Protocol specifications are:

SLV	'Speedlevel', sub protocol level - adaptation fully automatic.
NTO	Number of tones (sub carriers) used on actual 'Speedlevel'.
PDR	Physical data rate, raw bit rate (Bit/sec) transferred on the physical protocol layer.
NDR	Net user data rate (without data compression) (Bit/sec). If PMC (automatic online data compression) is activated, multiply with factor 1.9 in case of text files.
CFR	Crestfactor, envelope power ratio, peak average power (dB). If CFR is 3dB, a 100W SSB transmitter generates 50W mean output power without signal clipping or limitting.
SNR	Required signal-to-noise ratio.

SLV	NTO	PDR	NDR	CFR	SNR
0	2	200	76.8	2.7	*)
1	6	600	247.5	2.8	*)
2	14	1400	588.8	3.4	*)
3	14	2800	1186.1	3.6	*)
4	16	3200	2039.5	4.1	*)
5	18	3600	2722.1	4.4	*)

*) Depends on channel model. On an average channel, Pactor-III is around 3.5 times faster than Pactor-II. On good channels, the effective throughput ratio between Pactor-III and Pactor-II can exceed 5. Pactor-III achieves slightly higher robustness at the low SNR edge compared to Pactor-II.
Maximum occupied bandwidth: 2.4kHz @ -40dB, audio pass-band: 300-2700Hz.

- 2Mb static RAM
- New high quality case
- Built-in audio amplifier. Simply connect your favourite speaker and use the PTC-IIpro as audio de-noiser. The volume is controlled by software!
- Highly stable temperature-compensated oscillator. Makes your Pactor-II connection even more stable!

THIS MONTH ROGER COOKE G3LDI HAS MORE NEWS ON PACTOR-III.

Maximum net throughput with online data compression: ca. 5200 Bit/sec.
Notice that the online data compression provided by the PTC modems is especially useful for applications which do not allow offline (file) compression, e.g. E-mail via TCP/IP, etc. The PTC-II is the only h.f. modem on the market which offers efficient online data compression.

Link establishment:
The calling modem uses the Pactor-I FSK connect frame to be compatible with the lowest (PT-I) level. The called modem then answers and the modems negotiate to the highest possible level both modems are capable of. If one modem is only capable of Pactor-II, then the 500Hz PACTOR-II mode is used for the session. With the MYLevel command a user may limit a modems highest mode.

An example: a user may set MYL to 1 and a PTC will only make a Pactor-I connection, set to 2 and Pactor-I and II connections are available, set to 3 and Pactor-I through III connections are enabled. The default MYL is set to 2 with the current firmware and with Pactor-III firmware it will be set to 2.

When Pactor-III is released, if a user is only allowed to occupy a 500Hz channel MYL can be set to 2 and the modem will behave like the current Pactor-II firmware

NEW PTC-IIPRO

The new PTC-IIpro can be seen in **Fig. 1**. It doesn't look too different from the previous model, the PTC-II but the performance is enhanced as the figures below show:

- New, more powerful 24 bit DSP running at 100MHz with a computing power of 100 MIPS (max.)
- New transceiver control port supports transceiver with TTL and V24 interface out of the box!
- Silicon serial number. To easily identify your unit in case of theft (e.g.).
- Reduced power consumption! Only 200mA at 13.8V..
- Software controlled power off function. The new OFF command turns the unit off. Any character sent to the PTC-IIpro over the serial interface will switch it on again.

STANDARD FEATURES:

- PACTOR-II, PACTOR-I, AMTOR, NAVTEX, RTTY
- PSK31 - with spectroscope display on the tuning display
- SSTV - all different kinds of SSTV. Useable with nearly all available software, special JVComm32 mode!
- FAX - including AM-FAX for Meteosat
- Audio denoiser/filter - the PTC-IIpro is fully usable as DSP-filter for all modes
- Features: Auto-peak, auto-notch, pass-band-filter, inversion, delay-line, function-generator.
- CW-Terminal - CW-operation (RX and TX) with automatic speed adaption using high performance DSP-algorithms.
- Three simultaneously available communication ports: h.f. and up to two v.h.f./u.h.f. Packet ports.
- Separate transceiver control port for remote operation of Icom, Kenwood, Yaesu, R&S and SGC equipment.
- 32-bit system with Motorola 68360 as CPU, clocked at 25MHz.
- 24-bit Motorola DSP 56303 clocked at up to 100MHz (computing power: 100 MIPS)
- Firmware stored in flash memory. Easy up-

date via serial RS232 link to the PC. The up-date is free of charge and available from many Packet-Radio mailboxes and from the Internet site.

- Mark and space frequencies are freely programmable in 1Hz steps.
- Audio output-levels for all PSK- and FSK-modes programmable separately.
- Build-in mailbox with comprehensive features and simultaneous access from all modes (Pactor-I & II, AMTOR, PACKET).
- Programmable squelch function for RTTY operation.
- Battery back-up for the clock and C-MOS RAM. No mail-loss when switched off.
- Mail display on the front panel shows the operator at once if there is a new mail for him.
- Excellent tuning display with 15 2-color-l.e.d.s with center-function. The antique X-Y-t ube display is not required any more.
- All significant link and controller states are displayed on the front panel with 2-colour l.e.d.s and on the terminal-screen.
- 10-character dot-matrix-display for mode and other parameters as the callsign of a connecting station and much more.
- Channel-busy detection displayed on the PTC-display as well as on the terminal-screen.
- Comprehensive filtering of all in- and outputs for excellent electromagnetic compatibility.
- HF <—> VHF/UHF gateway and cross band digipeating with comprehensive and automated link establishment features from remote.
- Hostmode, extended hostmode, CRC-hostmode. Fully compatible to nearly all modern PC programs. Can be fully integrated in FBB/Winlink networking and mailing systems.

The unit comes with the usual standard accessories, such as manual, connecting cables and so on. Also recommended are the DSP Module and 9k6 modem. This is definitely a modem for the serious data user. Pactor is becoming the standard for h.f. communications of this sort, and this unit will be on quite a few Christmas lists, including mine! Now I just need to win the lottery.....

PACKET DEATH - PREMATURE!

Following on from discussions, both here and on the packet network itself, I noticed the following message from a station in North Carolina. The station operator, **WB4IUY** seems to support the mode very much and reading the message proves that it's far from dead! From wb4iuy@wb4iuy.#rtp.nc.usa.noam "Packet radio is very much alive here in the central part of North Carolina in the USA . In my local area we have:

#1 - The global (this network) Packet Radio BBS system. It is very robust, with lots of options for users to connect...ports on 145.01 and 147.54 at 1200baud, 223.70 at 9600baud and on 441.00 9600baud. Remote nodes in the area provide the distant user a method to connect, and the system works very well. It is maintained by a very dedicated sysop (WA4MJF) who keeps everything running in top condition.

● The new PTC-IIpro

#2 - APRS (Automatic Position Reporting System). This provides a graphical interface and allows for real-time keyboard chatting, as well as message delivery/holding, mobile tracking, real-time weather reporting, etc. Our APRS operation on v.h.f. is on 144.390. Lots of fun!

#3 - SEDAN (Southeastern Emergency Digital Association Network). This is a system spanning the eastern coastal states (and others) of the USA. and is dedicated to keyboard-to-keyboard communications in real time. No BBS forwarding, DXClusters, etc. Very efficient during emergencies, great for passing emergency traffic in times of need. SEDAN operates on 145.77kHz in our area.

● Roger G3LDI maintaining his satellite antenna installation.

#4 - DX Cluster: In my local area, we have a great DX Cluster with a local user node for spotting DX contacts and sharing this info with others. The DX Cluster also provides the ability to send mail, receive WWV info, DX Bulletins, etc. Lots of fun while DXing! The local DX node is called DXCLAY and operates on 145.67MHz.

#5 - Local area BBS system. We have a local area group of small BBS's for local chatter, tossing things around, and message storage. This system also has a 9600baud gateway for local users to jump over to theW4RAL global BBS. Our local area mailbox system is on 145.03MHz.

#6 - Packet<=>Internet Gateway: AA3DN has a local packet to internet gateway on 145.73MHz, 1200baud. This provides a wireless method of sending/receiving E-mail to and from the internet, as well as providing a message storage area and ports for users to connect out to the global RF Packet BBS system. It can also be reached via telnet, allowing folks to connect from the internet, and 'surf' out to RF-based users on Packet radio.

All of this activity can be participated in with basic packet radio equipment and has a lot of area activity. I have five packet stations that run in my shack full time, just to keep up with a lot of this fun stuff. I have my logging program to monitor the packet DXCluster for countries I don't have, the packet BBS connects to me and picks up/delivers mail twice per hour from around the world, I have several friends I talk to daily on APRS, etc. Just a few nights ago, I was chatting with someone several hundred miles away via keyboard chat on SEDAN on 144MHz.

Packet radio is not the internet, but the inverse is true as well. I hear some folks mention that the internet is much faster, but then I send E-mails via the internet to friends and it's days before they answer...so speed really isn't the issue.

I like packet radio because I can do all of this stuff when the power is out of phone lines are down, and it's just another facet of radio that has always intrigued me. What types of packet radio do you have available in your area"?

Well, now there's an invitation to send a message if ever I saw one! Try sending WB4IUY an E-mail and letting him know what **you** are up to, or your local packet group. His address is at the top of his message.

If you decide to E-mail WB4IUY, try and make sure that your message goes via radio BBS in the UK. Then it will end up at my Satellite Gateway, thus ensuring the continued use of this facility. There have been quite a few private messages passing through just lately, so that does encourage me somewhat. Just to let you see how your message gets to UO-22, see **Fig. 2** which shows my satellite antenna installation with me working on it!

That's all for this month, so until next time, 'happy keyboarding'

Roger G3LDI

IN VISION

BY GRAHAM HANKINS G8EMX

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GRAHAM HANKINS G8EMX REMINDS US OF THE BATC'S CONVENTION & REPORTS ON HOW HE'S GETTING ON WITH BUILDING G8SUY'S ATV KIT.

Unless you are a member of the British Amateur Television Club (BATC), this might be your last reminder in print that the BATC's Convention and General Meeting is now only a few weeks away. The date is **Sunday 16 June** with a dinner, social gathering and overnight accommodation available on the Saturday evening. This major event had to move from Bletchley back to the Shuttleworth Museum near Bedford and the full ATV programme is still being finalised. There should be a lecture stream, plus ATV demonstrations and links to local repeaters.

The most significant part of Shuttleworth this time will be the BATC's General Meeting. It's been about three years since the last GM; the Club's constitution does allow more than two years to elapse between meetings, so it's not before time that this GM was held. This is the opportunity for members to quiz the club's 'top table' about the BATC, examine and hopefully approve the accounts and elect an incoming committee. For latest details and a map of how to get there see the BATC's website at **http://www.batc.org.uk**

The BATC attended the London Communication and Computer Show, more commonly known as Picketts Lock. The Club was

● New banner at an old exhibition. The BATC stand with new banner, computer presentation an dconstructed kits, ready for the show to open.

positioned next to the North London Television Club (NLTC), so visitors could discover the local and national ATV scene.

The 24cm (1.3GHz) Enfield ATV repeater GB3EN was being accessed and received all the weekend and the latest additions to the NLTG's array of ATV 'toys' was a camcorder carrying a miniature 2.4GHz ATV transmitter and antenna. The BATC table featured a 'rolling' *Powerpoint* computer presentation to illustrate the basics of starting with ATV.

One visitor put a question to us ATV 'experts' that we couldn't answer 'on the spot'. The question was "when writing an ATV transmission in the log book, what code is put in the 'Mode' column"?

The Mode is an alphanumeric series used to describe an r.f. transmission. This includes how the carrier is modulated, by what type of baseband signal and the characteristics of the outgoing carrier. A few obvious examples for modulation are amplitude or frequency, baseband could be voice or vision, carrier could be single or double-sideband. But there are many variants of all of these!

Not to be beaten, we formed a 'Find The Mode' expedition, which asked the Radiocommunication Agency exhibition stand, searched the publications on the RSGB stand, looked through the *Yearbook* and even flicked through a logbook.

Nobody knew or could produce a listing of current modes. Eventually the information was found, on the RSGB stall, in a book of radio data. The closest was F3F - frequency modulation, single carrier with analogue information, television. Yes, **I know** f.m. ATV has colour and sound sub-carriers, but F3F seems to be the nearest.

At 1600hours on Sunday, the BATC, NLTG and all other exhibitors cleared their tables at Picketts Lock for the final time. I am told that the entertainments and caravan site will stay, but the sports building will be closing down, to be rebuilt as an Athletics Centre of Excellence. The London Communication Show moves to Ware, a few miles up the A10, from November.

● Brian Summers G8GQS BATC Treasurer chats to a visitor.

NEWS FROM BRIGHTON

Tony G4JZC writes: "Brighton, the new City by the sea, boasts not one, but three ATV repeaters covering 1270MHz, 10 and 2.4GHz, and two voice repeaters for 144 and 430MHz The credit goes to the Worthing ATV Group, which works tirelessly to maintain and update the equipment, which is located high up on Brighton General Hospital, near the Racecourse. A dedicated video repeater website keeps local Amateurs and visitors up-to-date with developments and the webcam is updated at regular intervals".

Tony continues: "You may ask why three ATV repeaters? There is a good deal of daily activity and a quad video splitting arrangement has been added, which can divide the final picture and enables multiple access to a dedicated camera via 24cm, 10 and 2.4GHz simultaneously".

Looking forward to the near future, the Worthing ATV Group will replace the tried and trusty Amiga with a PC and the newer Matrix system devised by the Group will provide a flexible switching solution. Find the Group on the web at **http://www.videorepeater.co.uk**

KIT OF BITS

"Building a piece of electronic hardware from a 'kit of bits' can be fun" was my opening line for the April issue of In Vision, as I started to construct the G8SUY 24cm Amateur Television transmitter kit. The fun actually started when one of the surface mounted devices (s.m.d.) resistors went 'ping' out of the jaws of the tweezers, to be lost forever somewhere in the pile of the carpet! Great care is also needed as the s.m.d.s are removed from their packaging - drop them onto a large sheet of white paper!

Amazingly, the rest of the resistors went to their respective positions on the p.c.b! Working under a magnifying lens, with 32 s.w.g. solder, a 15W iron and point tip, only the smallest dab of solder was applied to a pad, one end of a resistor was slid onto the molten solder and fixed into position. Then the other connection was soldered.

Securing all 20 of the miniature resistors only took about an hour. I hope to be testing the transmitter next time. **Andy Parnell G8SUY**, turned up at the Picketts Lock show and gave me some hints on achieving the best output power and pointed out:

"The transmitter is a re-design of a previously published circuit, replacing obsolete and hard-to-get components with more readily available ones". Andy adds: "The G8SUY ATV receiver will be available when a new supplier of suitable 24cm tuner units can be found". Andy can be contacted by E-mail at **andy@atvroom.freeserve.co.uk**

That's all for this month so, P5 until next time!

Graham G8EMX

TUNE-IN

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TOM WALTERS UPDATES US ON YET MORE PROPOSED CUTS IN THE WORLD OF INTERNATIONAL BROADCASTING

There's a new kind of international radio broadcast on the air. On 6 April a group of Central European international broadcasters - **Radio Austria International**, **Radio Slovakia International**, **Radio Budapest**, **Radio Prague** and **Radio Polonia** – started an idea that they've been chewing over for a long time - a jointly-produced programme called *Insight Central Europe*.

The aim of *Insight Central Europe* is to track developments in the five countries, which are hoping to join the European Union. The programmes can be heard in the five co-operating countries, in all the existing member countries of the EU and indeed in the rest of the world. Listen to them on Radio Austria International on Saturdays and Sundays: Europe, North and West Africa at 1130-1200; 1330-1400 and 1830-1900: North America (West) at 0030-0100; Pacific/Far East at 1130-1200. The programme is also available on-line at **http://roi.orf**

There's a bit of a rumpus going on a little further East. **Radio Liberty** has started broadcasting in Chechen, to the disgust of Moscow. Trying to put the 'frighteners' well and truly on, the Russian spokesperson claimed that "the broadcasts to the Caucasus might worsen security in Russia as well as the USA". Whatever do they mean?

AMERICAN TROUBLES

The Americans are in more trouble. The **Voice of America** has at last launched its much-trumpeted **Middle East Radio Network (MERN)**. It won't be on short wave, but after making a start on f.m. in Amman (Jordan) and the West Bank and also in Kuwait City, it will become much more widespread via the radio channels of satellites Nilesat, Arabsat and Eutelsat.

Eventually MERN will be heard on medium wave as well as f.m. President Bush is quoted as saying "The Middle East Radio Network will offer music, reliable news and information in Arabic, and an opportunity to better understand American principles and American actions".

The first outraged Middle Eastern country off the mark was, not surprisingly, **Iraq**. According to a leading Iraqi newspaper, the USA will not change its attitudes. "It has decided to carry out an all-out propaganda onslaught on the Arab mind to falsify its perceptions and alter its convictions. This onslaught targets Arab and Muslim public opinion, especially young Arabs, to encourage them to carry out the task that it alleges that the Arab media, particularly Arab television stations, neglect to carry out. It accuses these media of bias and of disseminating hatred among the Arab masses for the United States and the Zionist entity". There were screeds more of the same to follow, leading to the idea that Iraq is not best pleased with the new radio network!

The 'Zionist entity' referred to is of course Israel, which in Iraq's eyes is not a real country. But it's real enough to have had an extensive overseas radio operation for many years - **Israel Radio International (Kol Israel)**. The whole of this complex transmission structure had been threatened by closure through projected cost-cutting by a Government department. But it looks as though minds have been changed.

Fury within Israel was amplified by a chorus of protest from angry Jews living outside Israel. Many of these 'diaspora' Jews live in countries without access to advanced technologies. As the plan had been to replace short wave transmissions by satellite and Internet transmissions, which are a scarce commodity in poorer countries, it seems that common sense has prevailed.

The cuts at Kol Israel have been deferred, and a new website Friends of Israel Radio is to be established. Short wave transmissions (winter schedule, not revised at time of writing in April) are English: at 0400-0415 on 9.435, 15.640, 17.535; 1030-1035 on 15.640, 17.545; 1600-1630 on 15.615, 17.545; 1900-1925 on 11.505 and 15.615MHz. Hebrew: at 0000-0000 on 15.760; 0100-0500 on 13.850; 0330-0500 on 11.590; 0500-0100 on 17.535; 1600-0330 on 11.585; 1800-1850 on 15.640 and at 2000-2115 on 15.640MHz.

Other languages (from which you can see that many listeners are indeed deprived of technology) are French, Spanish, Ladino, Moghrabi, Russian, Persian, Yiddish, Hungarian, Bukharian, Georgian, and Romanian. It doesn't seem like a good idea to give this lot up, just for

the sake of cost-cutting, at such an extremely sensitive time for Israel. You can get full information, and read all about the punch-up over the cuts, on the website **www.israelradio.org**.

CUTS LOOMING FOR RNZI

The cuts monster is now looming over poor inoffensive little **Radio New Zealand International** (RNZI). For the second time!

Four years ago, they had their programming cut in half. Now, it seems that RNZI's electricity bill has gone up so much, that the government won't pay up the extra amount. Sadly, the head of parent organisation Radio New Zealand said about RNZI: "At the moment we are down to absolutely skeletal broadcasting. We're having to look at contemplating cutting further".

With its tiny, almost invisible staff, RNZI manages to cover all the Pacific Islands and much further afield. Here's their schedule from 31 March. Most of it is intended for the Pacific only, but reception elsewhere is possible, as indicated: 0459-0659 all Pacific, and Europe on 15.340; 0659-1105 all Pacific on 11.675; 1106-1305 NW Pacific, and Asia on 11.675; 1306-1650 all Pacific (for sports broadcasts and weather warnings); 1650-1750 (Mon-Fri) Pacific Islands on 6.095; 1751-1850 (Mon-Fri) Pacific Islands on 11.725; 1851-2050 all Pacific, and Europe; 2051-0458 all Pacific, and West coast of USA.

Of course, the transmissions are not really targeted at Europe, Asia and the USA. They get there more by luck than intention, and may not be very stable.

For full information about international radio programmes in English, plus much information about international television as well, the **Association for International Broadcasting (AIB)** will shortly publish the latest edition of its *Global Broadcasting Guide*. Full details from **AIB, PO Box 4440, Walton, Essex CO14 8BX** or **www.aib.org.uk**

Copies of the *Global Broadcasting Guide* are available from the PW Book Store priced £2.25 plus P&P.

Bye for now. Tom

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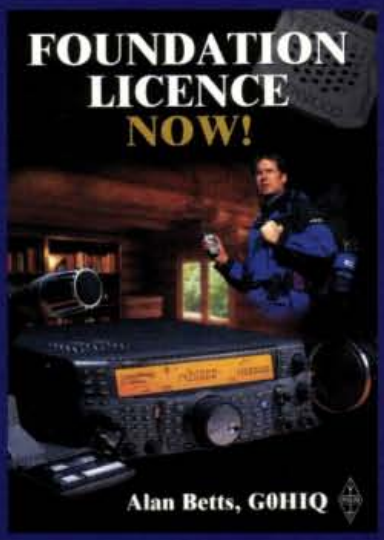

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Whilst prices of goods shown in advertisements are correct at the time of going to press, readers are advised to check both prices and availability of goods with the advertiser before ordering from non-current issues of the magazine.

For Sale

THE RF-KIT CATALOGUE. send 2x 2nd class stamps or browse www.rf-kits.demon.co.uk
Hands Electronics, Tegryn, Llanfyrnach, Pembs SA35 OBL. Tel 01239 698427.

QUARTZ CRYSTALS 1MHz/£2.95, 1.4MHz/£3.95, 3.2768MHz/£1.95, 3.932160MHz/£3.75, 4.0MHz/£1.00, 4.194304MHz/£0.75, 6.0MHz/£1.54, 7.03MHZ/£3.95, 8.9985MHz/£2.95, 9.0MHz/£2.95, 9.0015MHz/£2.95, 10.0MHz/£1.54,10.106MHz/£3.50, 10.245MHz/£1.54, 10.7MHz/£1.54, 11.155MHz/£3.50, 16MHZ/£1.54, 21.04MHz/£4.75, 21.06MHz/£4.75, 28.060MHz/£3.75, 45MHz/£1.75, 9MHz X-Tal filters for SSB & CW from £30.00/unit. 5MHZ, 6MHz, 10MHz OCXO's £12.50/unit. X-Tal circuits, applications booklet/£5.00. Cermamic resonators, applications booklet/£3.50. Wanted freq. sweep generator to 25MHz. Good price paid. IQ-Electonic Design. Tel: 020-8391 0545. E-mail: japj69@netscapeonline.co.uk

COPPER ISLAND CONSTRUCTION OUTFITS Build electronics circuits easily without etching or drilling. Full instructions enclosed. Just £17.95. Duncan Walters, 11 King George V Avenue, Mansfield NG18 4ER. Further information phone 01623 465443 www.copperisland.biz

VINTAGE SERVICE DATA - 1900 to 1970's - the largest library - est. 32 years - radio, audio, cinema, communications, military, television, test equipment, etc. Free catalogue/quote. Savoy Hill Publications, 50 Meddon Street, Bideford, Devon EX39 2EQ. Fax/phone 01237 424280. E-mail savoy.hill@lineone.net

DISCLAIMER

Some of the products offered for sale in advertisements in this magazine may have been obtained from abroad or from unauthorised sources. *Practical Wireless* advises readers contemplating mail order to enquire whether the products are suitable for use in the UK and have full after-sales back-up available. The publishers of *Practical Wireless* wish to point out that it is the responsibility of readers to ascertain the legality or otherwise of items offered for sale by advertisers in this magazine.

Wanted

WANTED FOR CASH Valve or solid state communication receivers Pre-1980. Preferably working and in good condition. Non working sets considered also domestic valve radios. Items of Government surplus wireless equipment and obsolete test equipment. Pre-1965 wireless and audio components and accessories. Pre-1975 wireless and TV books and magazines. Also, most valves wanted for cash. Must be unused and boxed. CBS, 157 Dickson Road, Blackpool, FY1 2EU.
Tel: (01253) 751858 or Fax: (01253) 302979.
E-mail: chevet@globalnet.co.uk

Valves

VALVES GALORE Most valves available from stock. Otherwise obtained quickly. Please send SAE stating requirements or telephone.

VALVE & ELECTRONIC SUPPLIES Chevet Books, 157 Dickson Road, Blackpool FY1 2EU.
Tel: (01253) 751858 or Fax: (01253) 302979.
E-mail: chevet@globalnet.co.uk

VALVES:- OVER 50000 STOCKED Ham, Vintage, Military, Audio. SAE for FREE list to: Wilson Valves, (Jim Fish G4MH), 28 Banks Ave., Golcar, Huddersfield, West Yorks HD7 4LZ.
Tel: 01484 654650/844554/650725.
Mobile:- 07733 283084.
Fax: 01484 655699.
E-mail: wilsonv@zoo.co.uk
Visa etc. Fast & personal service.

VALVES AND ELECTRONIC COMPONENTS Large stocks. Send for list to: Stuart Scott, 19 Portway, Steying, W. Sussex BN44 3QF.
Tel/Fax: 01903 815118.
E-mail: triumph.76@btinternet.com

VALVES WANTED NEW AND BOXED!! KT66 GEC £35, KT88 GEC £60, EL34 & EL37 Mullard £27, EL84 £4, DA30, DO30, PS25 all at £120 each. PX4 globe shape £70. DA100 GEC £150, ECC83 Mullard £5, GZ32 & GZ34 Mullard £10, ECC32 & ECC33 Mullard £15. Other types wanted.
Colomor (Electronics) Ltd.
Tel: 01403 786559.
E-mail sales@colomor.demon.co.uk

VALVES AND ALLIED COMPONENTS in stock - please ring for free list. Valve equipment repaired. Geoff Davies (Radio). Tel: 01788 574774.

TOP PRICES PAID

for all your valves, tubes, semi-conductors and ICs.

Langrex Supplies Ltd.
1 Mayo Road, Croydon Surrey CR0 2QP.
TEL: 0208-684 1166. FAX: 0208-684 3056.

Miscellaneous

INTERESTED IN VINTAGE TECHNOLOGY? New and previously enjoyed books and magazines. Send 2 x 1st class stamps to: Old Time Supplies, P.O. Box 209, Banbury, Oxon OX16 1GR or visit www.oldtimesupplies.co.uk

AGAPEMONE ANTIQUES, ESSEX. Valve radio restoration. All work fully guaranteed. Spares and service sheets also available. Tel: 01621 858043.

QRM REDUCTION FILTER PCB module to reduce QRM on SSB signals. For details: www.rlaver.dial.pipex.com/filt1.htm

QUALITY COMPUTER SYSTEMS at very competitive prices.
See www.storm-computers.net.
Tel: 02920 400779.

BUILD A COMMUNICATIONS RECEIVER Fascinating projects from 10-50 . . . free catalogue, 33p SAE; QRP, 27 Amberley Street, Bradford. W. Yorkshire BD3 8QZ.

Please photocopy this form if you prefer

ORDER FORM FOR CLASSIFIED ADS

PLEASE WRITE IN BLOCK CAPITALS

The prepaid rate for classified advertisements is 42 pence per word (minimum 12 words), box number 70p extra. Semi-display setting £13.90 per single column centimetre (minimum 3cm). Please add 17.5% VAT to the total. All cheques, postal orders, etc., to be made payable to PW Publishing Ltd. Advertisements, together with remittance, should be sent to the Classified Advertisement Dept., Practical Wireless, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: (01202) 659920, Fax: (01202) 659950

Please insert this advertisement in the ..... issue of Practical Wireless (if you do not specify an issue we will insert it in the next available issue of PW) for ..... insertion/s. I enclose Cheque/P.O. for £..... (42p per word, 12 minimum, please add 17.5% VAT to total).

Name:.....

Address:.....

.....

.....

Telephone No.:.....

Box Number @ 70p: Tick if appropriate.....

Category heading: .....

Order Form

Photocopies of this page are acceptable

FOR ALL MAIL ORDER PURCHASES IN *PRACTICAL WIRELESS*

Check out our Web Pages at:
http://www.pwpublishing.ltd.uk

SUBSCRIPTION RATES

Practical Wireless – 1 year.

- ❑ £30 (UK)
- ❑ £38 (Europe Airmail)
- ❑ £42 (Rest of World Airsaver)
- ❑ £49 (Rest of World Airmail)

Special joint subscription with

Short Wave Magazine – 1 year.

- ❑ £60 (UK)
- ❑ £73 (Europe Airmail)
- ❑ £81 (Rest of World Airsaver)
- ❑ £93 (Rest of World Airmail)

Monitoring Times – 1 year (12 issues).

- ❑ £38 (UK)
- ❑ £43 (Europe Airmail)
- ❑ £49 (Rest of World Airmail)

BUY OF THE MONTH

❑ Please send me ..... copy(ies) of ***Foundation Licence Now!*** at the special price of **£3.50 plus £1.25. P&P (UK), £2.50 P&P (overseas). Offer closes 12 June 2002.**

£ .....

Book Orders

..... £ .....Code.....
..... £ .....Code.....
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Binders: £6.50 per Binder
Postal charges:
UK: £1.25 for one item, £2.50 for two or more items.
Overseas surface: £2.50 for one item, £4 for two items, three or more add an additional 50p per item. Airmail prices on application.
Binders P&P: £1.25 for one, £2.50 for two or more.

GRAND TOTAL ..... £ .....

Thank you for using PW for your purchases

PAYMENT DETAILS

CREDIT CARD ORDERS TAKEN ON (01202) 659930
between the hours of 9.00am - 5.00pm. Outside these hours your order will be recorded on an answering machine.

FAX ORDERS TAKEN ON (01202) 659950
or please fill in the details ticking the relevant boxes, a photocopy will be acceptable to save you cutting your beloved copy!

To: PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW

I enclose my Cheque/Postal Order* for £ .....
made payable to PW Publishing Ltd. (*Delete as necessary)
or please debit my Access/Visa/Amex card No.

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Expiry Date.....

or please debit my Switch card No.

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐

Date.....Switch Issue Number (if on card.....

Switch Expiry Date.....

Signature .....

Name .....

Address .....

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.....

.....

.....

Postcode.....Daytime Tel. No.....

.....

Orders are normally despatched by return of post but please allow 28 days for delivery. Prices correct at time of going to press. **Please note:** all payments must be made in Sterling. Cash not accepted.

topical talk

Looking at projects from the past

May 1963 PW front cover

Whilst our keen Editor (very keen still but rather slow when it comes to construction nowadays) was preparing the forward planning for this rather special celebratory year he received a very interesting letter and photos from long-time (and truly dedicated) reader **Roger Bebbington M0BWP**, from St. Helens, Merseyside. Our Editor was so impressed with the photographs, he thought "We must share these with readers"!

Actually, Roger's letter and photographs, **Fig. 1, 2** and **3**, so impressed our busy bearded leader that he even found time to show them off to the rest of the Editorial Team. And, as you can see, the photographs show the super double conversion receiver project which was originally featured in the May, June and July 1963 issues of *PW*.

We were all **really impressed** with Roger's workmanship. You can tell he's a professional mechanical engineer can't you?

Fig.2

Fig.3

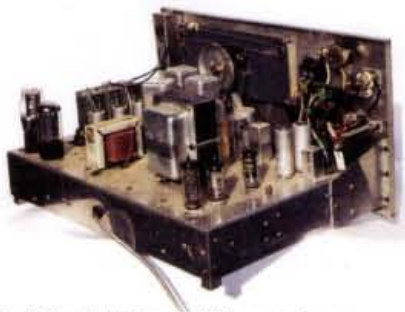

Fig. 1: Roger Bebbington M0BWP's receiver, from a design published in *PW* by P. R. Lewis during 1963. Both Roger and the Editorial team would like to learn more about the designer - can you help?

Many Other Projects

Unfortunately, Roger M0BWP's full collection of projects which he built over the years has now been dispersed but he has many memories of what he built and what work went into them. His letter to the Editor included the suggestion "If you would like me to do a piece on them for your vintage section please let me know". **Needless to say...our Editor wrote back immediately**.

Roger's article will appear sometime later this year. In the meantime it's our pleasure to say 'thank you' to him for the superb photographs, and await the incoming article.

Projects From The Past

Have you still got a project you built from *PW* - let's say from the 1950s or 1960s? If you have...**please let us know**. We'll be pleased to hear from constructors (It's rare for us to hear from builders of projects from 30 years or so ago but it would be fascinating).

While discussing projects, it's impossible to think of the subject without remembering the (once very popular) *PW* Blueprints which helped many a constructor to success. And to pay tribute to the (now very collectable) 'blueprints' Valve & Vintage author **Phil Cadman G4JCP** is preparing a three page 'special' for the September issue. So, let Phil know if you've got particular favourite designs - with memories to accompany them. Write to him at **21 Scotts Green Close, Scotts Green, Dudley, West Midlands DY1 2DX**, or via E-mail at **phil@valveandvintage.co.uk** - he'll be pleased to hear from you. *PW*

YOUR SPECIALIST & LOCAL DEALERS

Index to Advertisers

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Icom has taken the DSP technology recently introduced in the IC-756PROII and created a whole new radio category. The NEW IC-7400 incorporates the 32-bit DSP features to create some of the most flexible signal enhancing, and interference reduction ever offered in this type of radio!

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- AGC loop management
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- Microphone equaliser
- Built-in Memory keyer
- Built-in Noise Blanker
- SSB/CW Synchronous Tuning
- Ample functions for CW operators

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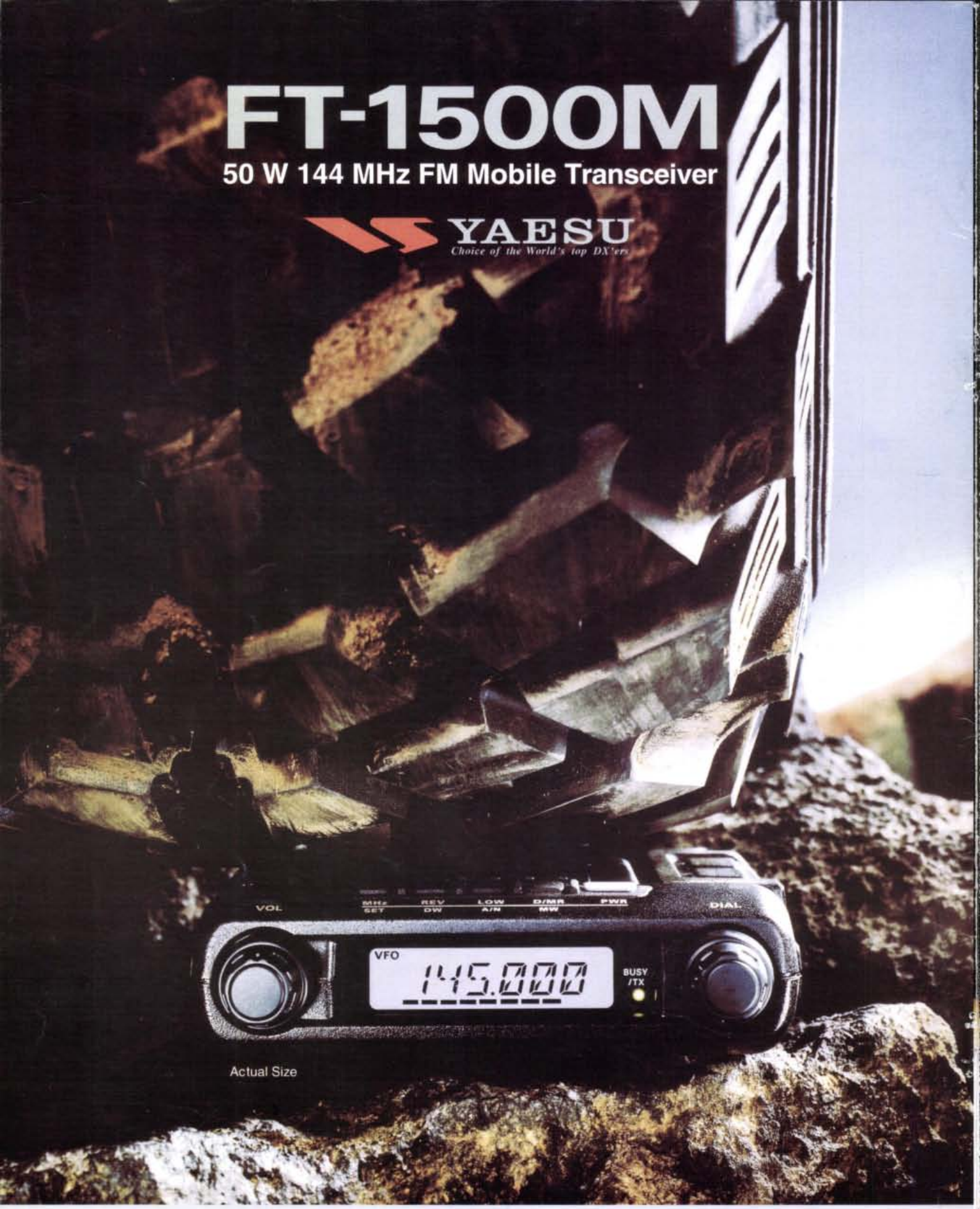

Actual Size

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